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(Signed) Sally E. Brenton-Haden

Permanent Address:
11444-46 Avenue
Edmonton, Alberta
Canada, T6H 0A5

Date: October 3, 1997

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled **Metacognitive Strategies and Attribution Training with Children Displaying Attentional Problems** submitted by Sally Elizabeth Brenton-Haden in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Special Education.

Dr. R. F. Mulcahy

Dr. T. O. Maguire

Dr. E. J. Watkinson

Dr. F. D. Snart

Dr. G. M. Kysela

Dr. J. W. Chapman

Date: July 23, 1997

Dedication

To
my father,
Stewart Brenton,
whose
unconditional
love and support
enabled me to
reach for, and achieve,
my dreams.

Dad,
thank-you
for always
believing in me.

ABSTRACT

This study examined the relationship between metacognition and the use of cognitive and metacognitive strategies, and the involvement of students with attentional problems participating in academic tasks in the language arts content area. The relationship between metacognition and the attributional components of learning and achievement, along with the combined effect of these components on the performance of nine students was investigated. As well, this study attempted to determine the feasibility of implementing such an intervention program within the context of the regular classroom, given the current state of changes in education.

Nine students who displayed characteristics indicating attentional problems participated in an intervention program involving the teaching of cognitive and metacognitive strategies as well as attribution training within a whole-school context. Students were assessed from pre- to post-intervention change in achievement on the basis of the Metacognitive Reading Awareness Questionnaire, the Canadian Achievement Test, the Self-Perception Profile for Children and A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom. As well, the concurrent verbalization 'Think Aloud' procedure was used by

students as a strategy to self-regulate their learning and use of strategies. This procedure was also used by the investigator to document students' strategy use and attributional statements.

Results indicated that students became more metacognitively aware of their reading strategies and showed a significant increase in reading comprehension achievement level. Students were able to use the strategies effectively in the areas of reading comprehension, creative writing, and writing for research purposes. Use of the Think Aloud procedure demonstrated how students' self-thoughts not only successfully guided their academic behaviour in terms of increased self-regulation, but also how their attributions of success in reading and writing to effort became linked to strategy use.

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CHAPTER ONE

INTRODUCTION

The purpose of the present study was to examine the nature of the relationship between metacognitive and cognitive strategy instruction with students displaying attentional problems in academic tasks. The study attempted to investigate the relationship between metacognitive and attributional components of learning and achievement on the academic performance of these students. Also, this study explores the feasibility of implementing a metacognitive instructional approach in the regular classroom, within a whole-school context.

Recently, educators have identified a growing number of students who are experiencing a wide range of learning difficulties. This number includes a group of students who are unable to sustain attention and concentration in the classroom. These students are of concern to researchers and professionals in the field of education due to their inability to take control of their learning, particularly with respect to making effective use of cognitive and metacognitive strategies that enhance the acquisition, transfer, and use of knowledge and skills. These students also are of concern as they also demonstrate an inability to control feelings and emotions, and attributions of failure and success in an appropriate fashion, that is to say, in a way which is likely to promote developmentally positive behaviour. This inability to self-regulate their learning

and behaviour often results in poor academic performance (Barkley, Fischer, Edelbrock & Smallish, 1990; Day & Peters, 1989) along with difficulties in social interaction (Barkley, 1997).

Students who display problems with attention may be referred to as displaying characteristics indicative of Attention Deficit Hyperactivity Disorder (ADHD). Although not all of these students display all of the characteristics associated with this syndrome, particularly the impulsivity/hyperactivity, the majority would display the characteristics of Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type. This study is concerned with students who have significant attentional difficulties who do not necessarily fall formally into the classification of ADHD.

Students with attentional problems display a wide range of characteristics in their learning which may ultimately result in academic underachievement. The inability they display to focus their attention and to sustain this attention often leads to decreased performance on academic tasks. These students also may have a wider attentional field than peers who do not exhibit attentional problems, and therefore they appear to be distracted. Attention to peripheral stimuli also contributes to their learning difficulties. The inability to sustain attention and inhibit responses to distracting stimuli often prevents these students from developing and mastering problem solving strategies.

There is significant evidence to suggest that belief systems play a critical role in the approach students with attentional problems take in relation to their classroom learning. Attributional beliefs are beliefs that involve feelings of personal self-competence and perceptions of personal control and self-efficacy, as well as an intrinsic motivation for learning. These attributions form the main

components of the self-system, and have been demonstrated to influence performance and lead to, or hinder, self-regulated learning. It has been suggested that this facilitation of self-regulated learning depends on factors such as students' acquisition and use of strategies, as well as the belief that strategic effort facilitates increased levels of achievement (McCombs, 1988). They are, therefore, critical components for the academic success of these students.

The purpose of this study, therefore, is to address the issue of appropriate metacognitive and cognitive strategy instruction for students with attentional difficulties, along with the efficacy of implementing such instruction within the regular classroom and the total school context. The following chapters provide a selective review of the literature, followed by a description of the method, results and discussion. The final chapter presents conclusions and implications of the study.

CHAPTER TWO

REVIEW OF THE LITERATURE

In the following sections, the literature with respect to students' self-regulation and learning is examined, including the roles played by metacognition, motivation, attribution, and affect. As well the literature related to students displaying characteristic attentional problems and difficulties in self-regulation as it affects their learning is reviewed. The first section describes an information-processing model of intelligent behaviour, which provides the framework for exploring the critical components for effective and efficient learning. The next section reviews the literature with regard to metacognition and learning as it relates to the academic performance of students. In subsequent sections the relationships between, and the importance of, motivation, attribution, and learning are explored with respect to students' achievement in the classroom. This is followed by sections describing the characteristics indicative of ADHD as presented in the research literature, and an examination of the learning processes of these children.

The preferred terminology of the investigator when referring to these children is to describe them as displaying characteristics of inattention and attentional problems with associated deficits in self-regulation. When referring to research carried out by others, however, the terminology of the specific researcher will be used. This necessitates the use of such terms as Attention Deficit Hyperactivity Disorder (ADHD), Attention Deficit Disorder (ADD), and

Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type interchangeably. The focus here, in examining the literature, is on children described in the studies as displaying primarily attentional problems rather than children who display this characteristic combined with overactivity and behavioural impulsivity. This review of the research helps elucidate the specific learning difficulties children with attentional problems experience.

An Information-Processing Model of Intelligence

A framework for understanding the conceptualization of intelligence and cognition is provided in the work of Sternberg (1977, 1984, 1986) in his Triarchic Theory of Human Intelligence. This conception of the nature of intelligence states that intelligence is comprised of three interrelated factors involving componential, experiential and contextual components. The componential relates intelligence to the internal world of the individual, specifying the mental mechanisms that lead to more intelligent or less intelligent behaviour. The experiential involves the interplay between experience and intelligence, and examines at what point in an individual's experience with tasks or situations intelligence is most critically involved in dealing with novel tasks and later automization of processes. The contextual relates intelligence to the external world of the individual and includes the role played by society, environmental adaptation, environmental selection, and environmental shaping.

Sternberg's (1986) Componential Subtheory of Intelligence distinguishes among several different kinds of information-processing components and speculates on the nature of interactions among them. This model can be used both in the qualitative and quantitative analysis of

information-processing behaviour. The basic construct in this theory is the component, an elementary information process that operates upon an internal representation of an object or symbol. Performance components are processes used in the execution of strategies. Knowledge acquisition components are processes involved in learning new information. These two also include retention components, involved in storing and retrieving information that has been previously acquired, and transfer components which carry over retained information from one situational context to another. Sternberg (1986) suggests that there are variables that affect acquisition, retention and transfer of information presented in real-world contexts. These variables include the amount of experience with a given type of problem or information, the variability of the contexts in which the problem or information has been encountered, the importance of the problem or information to the task context, the recency or occurrence of a given type of problem or piece of information, the helpfulness of the context to understanding the problem or information, and the helpfulness of stored information to understanding the problem or new piece of information.

Metacomponents are higher order control processes that are used for executive planning and decision-making in problem solving. Metacomponents are used to decide what the problem is that needs to be solved, select lower order components that will be necessary to arrive at a solution to the problem, select a strategy for combining lower order components, select one or more organizations of information upon which the lower order components or strategies can act, decide upon a rate of problem solving that will permit the desired level of accuracy, and monitor progress toward a solution.

This theory provides a useful framework for discussing the components

of effective and efficient learning relevant to all students, and, within the context of this study, to students with attentional problems in particular. This is due to the broad base for understanding intelligence provided by Sternberg in his model that allows a detailed examination of potential learning difficulties experienced by students.

One of the most important components in Sternberg's Triarchic Theory is the metacomponent, as all other learning and performance components must be filtered through the metacomponent. There has been, over the past decade, a vast amount of research with regard to this metacognitive construct and its relationships to self-regulation of learning and performance. The following section provides a brief review of the literature with regard to self-regulation and learning.

Self-Regulation and Learning

Metacognition is defined as the introspective awareness of an individual's own cognitive processes and self-regulation (Wong, 1986). Metacognition "refers to one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g., the learning-relevant properties of information or data" (Flavell, 1976, p. 232).

In cognitive psychology, the individual is viewed as an information-processor, interacting actively with the environment. Two systems are involved in the information processing model. The representation system deals with the selection, organization, attention to and interpretation of information. The executive system involves the functions of planning, monitoring, checking, and evaluating actions and thought processes. These metacognitive skills are

necessary for feelings of self control. "Self-control during learning requires learners to engage in self-evaluations of understanding, self-evaluations of competence, and a variety of other metacognitive activities, including being aware of the nature and process of learning, personal learning styles and deficiencies, and conscious self-monitoring and decision making (planning) during learning" (McCombs, 1988, p.150). Training in metacognitive skills provides strategies for the self-management and self-control of learning and performance.

Brown and Palincsar (1982) and Brown, Bransford, Ferrara, and Campione (1983) posited that students must be aware of both the purpose and significance of strategy use. If metacognition involves executive control, then training regarding the importance of metacognitive skills should increase awareness of the effectiveness of strategy use. Proponents of metacognitive theory are of the position that students must be aware of the purpose and the significance of training, as well as the relationship between strategy use and the range of applicability, in order for students to maintain and transfer specific learned strategies (Wong, 1986).

Flavell (1976) and Brown (1980) were among the first to develop the theoretical concept of metacognition and apply the concept to childrens' learning. Later researchers have attempted to further discover the complex relationships between this concept of metacognition and strategy use (Wong, 1986). For example, Borkowski and Muthukrishna (1992) stated that the mere acquisition of discrete strategies is not enough to enable students to become active and thoughtful participants in their own learning. Students must be able to coordinate multiple strategies and switch strategies when they realize that

their learning approaches are not effective. To do this, the students must be aware of what they are doing, that is, to be involved in the metacognitive processes of planning, monitoring, and evaluating. Borkowski and Muthukrishna (1992) further proposed that in order for students to be aware of the relationship between the role of metacognition and the use of strategies, teachers must "understand the complex interactive nature of metacognitive development, they must understand what a strategy is, observe a variety of strategies in operation, and appreciate the personal-motivational contexts in which flexibly used strategies operate" (p. 482).

Borkowski, Johnston and Reid (1987) attempted to determine why students with a variety of special needs do not recognize and understand the usefulness of a strategy in situations other than the one in which it was taught. They described it as a lack of awareness about the utility and applicability of the strategy in a variety of situations, in other words, a failure in metacognition.

Current learning theory regards the learner as an active participant in the learning process, and students are seen as being responsible for their own learning. In order for the student to be able to undertake this active-participant role, and to be able to take responsibility for learning, the student, in addition to having the metacognitive and cognitive skills necessary for efficient learning, must be motivated to learn and achieve academically.

Motivation is seen as a central component in the self-control of learning; the student must be intent in terms of motivation. McCombs (1988) suggested that it is imperative that one understands what constitutes the "will to maintain motivation and use appropriate strategies" (McCombs, 1988, p. 142), and draws on the work of Wittrock (1986) who proposed that motivation is affected by belief

systems, perceptions, expectations, and attributions. Motivation results from feelings of self-efficacy and self-control and is seen as "an important functional role ... to contribute to the maintenance of positive self-views and perception of self-efficacy and personal control that underlie the ability to change negative attitudes and orientations toward learning" (McCombs, 1988, p. 142).

It is hypothesized that there are several conceptual frameworks that contribute to the general construct of motivation. The first of these is competence motivation, which, as argued in White's (1959) work, directs, selects, and is persistent, and which satisfies the intrinsic need of the student to deal with, and interact effectively with, the environment. The student directs and selects behaviour, in terms of attention and actions, toward satisfaction of this need. White (1959) stated that these environmental factors are brought under control, allowing the student to become more self-determining, resulting in more effective interactions with the environment. Adelman and Taylor (1990) provide more recent support for White's work, stating that self-determination is a fundamental need leading to the seeking out of challenges. This seeking and conquering of challenges is, in turn, fundamental to the development of internal structures necessary to guide subsequent actions.

The work of Harter (1981, 1982, 1985, 1986, 1987) further defines competence in terms of perceived competence and perceived control, and suggests that students must have an internal rather than external locus of control in order to facilitate an understanding of self-regulation and, hence, motivation. Harter (1986) found that children judge and categorize information about the self in both global and domain specific ways. The concept of a child's global self-esteem or self-worth emerges at about the mental age of eight.

Harter (1987) also found the importance one attaches to being competent in a particular domain, and the support one perceives is available from significant others, to be relatively independent determinants of global self-worth. In addition to a generally agreed upon importance of self-evaluation in the development of a healthy self-system, Harter (1982) found two other self-system processes important to self-regulated learning: self-observation and self-reward. All three of these self-system processes are argued by Harter (1982, 1987) to involve the self as an active agent in engaging these processes.

The second contributing theory to self-regulated learning is self-efficacy theory, which, as presented in the work of Bandura (1982), suggests that perceived competence (self-efficacy) and self control (personal agency) are emphasized in motivation and performance. Bandura suggests that feelings of self-control result from development of a range of competencies, self-perception of efficacy, and self-regulatory capabilities. More simply stated, motivation is determined by a student's perceptions of the abilities to control the learning situation. Bandura (1982) postulated that self-efficacy judgments come from four information sources, these being enactive attainments, vicarious experience, verbal persuasion, and the awareness of physiological state. He suggested that when these four are assessed by the student, and measured, both in terms of the student's own personal standards, and against the standards of others, the satisfaction that results may serve to increase motivation. Still working within this theoretical framework, it is suggested that goal-setting is an important component part of the overall process, since this allows students to evaluate themselves against internal standards - a metacognitive process which ultimately serves to increase motivation.

Support for this theory is provided by Bandura and Schunk's (1981) study which proposed that self-motivation is best created and maintained by setting attainable goals that lead to future goals. Self-perceptions of efficacy, they proposed, can also be developed by proximal subgoals. Attainment of these subgoals further serves to enhance self-efficacy. Similarly, goal proximity also may underlie the development of intrinsic interest. Their study "centred on motivational properties by which competencies, perceived efficacy and interest can be developed" (Bandura & Schunk, 1981, p. 588) and involved elementary school children experiencing difficulty in mathematics and who expressed disinterest in math activities. Students were assigned to one of three treatment groups, a proximal goal group, a distal goal group, or a no goal group, or to a nontreatment control group, and engaged in self-directed learning over seven sessions. Findings indicated that children who set attainable subgoals "progressed rapidly in self-directed learning, achieved substantial mastery... heightened perceived self-efficacy and interest in activities that previously held little attraction" (Bandura & Schunk, 1981, p. 595). These children were also more accurate in their self-appraisals.

The presence, then, of explicit goals, whether 'fixed' or 'emergent' is critical to motivation, with proximal goals being superior to long term goals within a hierarchical goal system that provides opportunity for both types of goals (Bandura, 1982; Schunk 1981). It is suggested that this system may be effective in sustaining motivation and performance.

Attributions for one's performance has been identified as a significant factor contributing to, or detracting from, self-regulated learning (Borkowski, Carr, Rellinger, and Pressley, 1990). Attribution theory differs somewhat from

the previous two theories discussed above, which looked at perceptions of personal control and competence, in that it assumes that the search for a causal understanding of failures is the underlying motivator of behaviour. Attributions influence performance and motivation, and high levels of performance and motivation result from viewing academic successes as personally caused rather than as a result of luck.

In terms of attribution theory, cognitions or beliefs are characterized along three dimensions: stability, internality, and intentionality or control. "Stability refers to the consistency of causes across time...(such as ability, task difficulty, and personality) ... Internality refers to factors within the individual such as ability, effort and mood... [while] intentionality refers to causes such as personal effort and interest..." (Bryan, Bryan & Dohm, 1994, p. 222-223). Interpretation of this view would suggest that if successes are perceived to be the result of ability, similar tasks are approached positively, with the expectation of success, while conversely, if successes are perceived to be as a result of luck or easiness of the task, perseverance is less likely to occur.

According to attribution theory, an individual's interpretation, then, of the causes of outcomes (success and failure) influence future behaviour. Dysfunctional attributions, then, place the causes of success and failure on such ability or external factors such as luck. These also may result in maladaptive affective states such as low self-esteem (Bryan, Bryan & Dohm, 1994). Additionally, it must be noted that success on tasks alone is not enough to enhance learning. Rather the success must be accompanied by a belief in effort. Furthermore, as stated by Carr and Borkowski (1989), the emergence of attributional beliefs is important in metacognitive development. This is discussed in more detail in a later section.

McCombs (1988) proposed a model that combined the components of attribution theory, and the construct of motivation. The model was developed...

> ... by assuming that a metacognitive system of executive processes is involved in both the knowledge (awareness) and control (self-regulation) of cognition and affect. This metacognitive system then interacts with both the cognitive and affective systems in the generation of perceptions of task requirements. Involved in the generation of these perceptions are generalized knowledge and control schemata and metacognitive strategies for self-awareness and self-regulation, generalized personality schemata and traits, affective (motivational) strategies for self-judgements and acceptance of personal responsibility for learning, as well as generalized cognitive schemata, abilities, and strategies for active information processing (McCombs, 1988, p. 155-156).

A close look at McCombs' (1988) work indicates that efficient versus inefficient learner differences in terms of motivation reflect a correlational relationship between low achievement and low motivation, and high anxiety levels toward learning, along with a lack of effective skills for taking personal control of the learning situation.

According to Borkowski, Carr, Rellinger and Pressley (1990) the emergence of a mature metacognitive system is facilitated by positive feelings of self-esteem and attributions of success and failure to effort. These attributions develop from a general strategy knowledge base and the recognition that complex tasks require effort for strategy selection and monitoring. These beliefs promote strategy-based cognitions and lead to positive self-esteem and attributions (Carr, Borkowski & Maxwell, 1991).

The emergence of attributional beliefs appears to be an integral aspect of metacognitive development, with an additional correlation with

school performance (Borkowski, Carr, Rellinger & Pressley, 1990). Additionally, Carr and Borkowski (1989) suggested that the development and use of cognitive strategies is closely tied to the self-system (which includes attributions, self-concept and achievement motivation) which, in turn, powers the metacognitive system. They further stated that the "dysfunctional attributions of exceptional children generally take the form of ability or externally controlled explanations for success and failure experiences" (Carr & Borkowski, 1989, p. 328). It would appear, then, that self-referent thoughts have the power to inhibit academic achievement, by serving to suppress the use of available strategies and the acquisition of new strategies.

A fourth theoretical framework, self-control theory, states that motivation for learning is greater in individuals with a more highly developed sense of personal control and competency. These students are more inclined to use previously learned skills in new situations. McCombs (1988), reporting on the work done by researchers such as Benware and Deci (1984), stated that "treatments that increase perceptions of control and active orientation to learning have been found to increase intrinsic motivation and conceptual learning (McCombs, 1988, p. 149).

In the study by Benware and Deci (1984), this relationship between active orientation and intrinsic motivation was examined by having one group of students learn material with the expectation of teaching the material to peers, while a second group of students expected to be tested on the material they were assigned to learn. Results indicated a significant difference between the two groups with the 'learning in order to teach' group expressing "greater

evidence of intrinsic motivation and [reporting] feeling more active in their learning than subjects who learned the materials to be tested on it" (Benware & Deci, 1984, p. 763). Findings also supported the belief that active learning leads to greater conceptual learning, in that the "opportunity to use information to act on one's environment facilitates intrinsic motivation for learning that information" (Benware & Deci, 1984, p. 764).

Self-evaluation is also seen by Wang and Lindvall (1984) as important as it relates to personal self-control and self-efficacy. Their position is that the learner makes competence judgments as they relate to an understanding of both the self and the task, as well as to learning conditions.

Deci and Ryan (1985) in subsequent research, have phrased the approach to motivation yet differently again by viewing motivation in human activity as influenced by three major psychological needs: self-determination, competence, and relatedness. These are seen as the intrinsic motivating forces that lead individuals to seek out challenges, a "behaviour which is fundamental to developing internal instructures that guide subsequent actions" (Deci & Ryan, 1985, p. 541), thus placing motivation in the category of growth-oriented activity.

Dweck (1986) further examined psychological factors that had a determining influence on how effectively students acquire and use skills, with "an emphasis on cognitive mediators...to how children construe the situation, interpret events in the situation, and process information about the situation" (p. 1040). In Dweck's work, the difference between adaptive and maladaptive motivational processes is articulated. Adaptive motivational patterns "are those that promote the establishment, maintenance, and attainment of personally challenging and personally valued achievement goals" (Dweck, 1986, p. 1040)

and are characterized by a mastery-oriented approach involving the seeking of challenges and persistence in the face of obstacles encountered in learning. Maladaptive motivational patterns, conversely, "are associated with a failure to establish reasonable, valued goals, to maintain effective striving toward those goals, or, ultimately, to attain valued goals that are potentially within one's reach" (Dweck, 1986, p. 1040). The goals that children pursue affect their reactions to success and failure and their cognitive performance.

The student with attentional problems often demonstrates an external rather than internal locus of control (Barkley, 1989). Malone and Lepper (1987) see a goal of motivational training to be the empowerment of the student with the motivation to learn in the absence of obvious external rewards or punishment. They suggest that even when students are extrinsically coerced to engage in learning activities, what, and how effectively, they learn may be influenced by their level of intrinsic motivation. In students with attention difficulties, the presence of motivation may enhance attention to and processing of presented material, thus enhancing optimal stimulation.

It is also suggested that an optimal level of challenge will stimulate the greatest intrinsic motivation. Bandura and Schunk (1981) hypothesized that motivation is maximal when uncertainty as to the outcome of a particular task is maximal, and that "self-motivation relies on the intervening processes of goal setting and self-evaluative reactions to one's own behaviour" (p. 586). They describe motivation as best being created and sustained by setting short-term goals that lead to larger long-term ones, and that these "proximal subgoals can also serve as an important vehicle in the development of self-percepts of efficacy" (Bandura & Schunk, 1981, p. 587). In their study, children who were experiencing difficulty in mathematics and who displayed disinterest in the skills

involved in mathematics became involved in self-directed, self-paced learning. Children were assigned to one of three treatment groups, involving the setting of proximal goals, distal goals, or no goals, as well as one control group which received no treatment. Results confirmed "the influential role of proximal self-motivators in the cultivation of competence, self-percepts of efficacy, and intrinsic interest" (Bandura & Schunk, 1981, p. 595). The children who set attainable subgoals for themselves progressed in self-directed learning, and achieved significant mastery of the mathematics skills. They also perceived themselves to more self-efficacious and were more interested in learning the material.

Corno and Mandinach (1983) have developed an interpretive process model of motivated learning. They see the central role being played by self-efficacy judgments, along with attributions to personal control, as two self-regulating processes critical to the onset and maintenance of motivated learning. Paris and Cross (1983) and Paris and Byrnes (1989) also see the learner's values, beliefs, and attitudes as motivational influences in strategy use and suggest that these three energize strategic behaviour to promote or deter motivation. The self-regulated learner, then, in terms of self control, is one "who seeks challenges, overcomes obstacles, sets realistic goals, and utilizes a battery of resources in approaching tasks with confidence and purpose" (Mulcahy, 1991, p. 385). Students who are are in control of their learning are able to independently manage their learning and are motivated, resulting in learning that is efficient and effective (Paris & Byrnes, 1989).

Harter (1982) and Covington (1983) suggested, furthermore, that motivation serves the role of preserving a sense of self-worth, and proposed that 'motivated cognitions' are ego defences that preserve self-esteem and reflect

beliefs and intentions which maintain feelings of competence and self-worth. Nickerson, Perkins and Smith (1985) further supported this hypothesis, stating that motivation is a necessary component of strategic behaviour and a precursor to strategy use.

Of particular relevance is the role played by the construct of volition within the framework of self-regulated learning in the control or enhancement of concentration and motivation of children who display problems with attention in the classroom. Corno (1989) defined self-regulated learning as "the internalization of learning and task management strategies, coupled with the ability to mobilize and maintain them when situations demand" (Corno, 1989, p. 112). Volitional processes are seen as the "capacity to readily protect one's own psychological state" (Corno, 1989, p. 111) and are explicit, therefore, in self-regulated learning.

The ability to maintain concentration despite the presence of varied and numerous distracters is considered by Corno (1989) as volitional. Viewed in this context, the student with attentional problems may be considered to be lacking in volition. Although there is a distinction to be made between volition and motivation, it is suggested that the two operate simultaneously and interchangeably to some extent, ultimately resulting in persistence toward a given task or goal. Kuhl (1985) postulated that volition can be viewed as "a series of action control processes ... post decisional, self-regulatory processes that energize the maintenance and enactment of intended actions" (Kuhl, 1985, p. 90). It is here that both the distinction between, and the inter relatedness of, volition and motivation are evident. Evident as well is the implication for intervention with the child with attentional problems, as the child may display a deficiency in both motivation and volition.

Extensive work on motivation and learning processes of students has been done by Ryan, Connell and Deci (1985) who see perceptions of autonomy and competence as fundamental to intrinsic motivation. Examined in the context of their work, children with attention problems may be viewed as having the same innate needs of self-determination and competence as all other children, thus leading to the question that explores the possible barriers that inhibit these students from generating strategies which enable them to meet these needs.

Corno and Rohrkemper (1985), by comparison, see self-regulated learning as the key dimension of intrinsic motivation, and explore "the internal cognitive processes of motivation and the relationship of these motivational thoughts to the higher-order mental processes associated with learning" ... [The focus of their research has been on] ... motivation to learn in the context where it is perhaps most elusive - the classroom" (Corno & Rohrkemper, 1985, p. 57). They outline five component processes of self-regulated learning, these being alertness, selectivity, connecting, planning, and monitoring. Each of these components interact with each other in the acquisition and transformation of information to enhance learning (Corno & Rohrkemper, 1985). Their ongoing research attempts to answer not only this question, but they have also sought to determine just what kind of intrinsic motivation is desirable for children to engage in when involved in classroom tasks; that is, what kind of motivation is most congruent with other objectives for classroom learning.

It was suggested by Corno & Rohrkemper (1985) that a definition of intrinsic motivation to learn for classroom education must reflect both aspects of personal responsibility, including obtaining goals through self-effort, a growing sense of personal control, and reduction of fear of failure, and also aspects of

competence, including exhibiting the ability to use appropriate academic material, the ability to engage in a complex task, and the capability to demonstrate efficient use of useful learning aids. Students with attentional problems may be deficient in all of these areas. These students, then, must learn to use the "social, academic, and personal resources available to them to accomplish learning objectives - that is they need to become self-regulated learners. The self-regulator capability, once developed, becomes self-reinforcing, and many of the personal responsibility aspects of intrinsic motivation will follow" (Corno & Rohrkemper, 1985, p. 58).

Interrelationships of Metacognition, Motivation, Attributions and Self-Regulation

It is impossible to examine self-regulation without looking at the interaction of metacognition, motivation, and attributions. Several researchers have attempted to delineate this relationship. For example, Carr, Borkowski and Maxwell (1991) studied 200 grades three, four and five achievers and underachievers using motivational, affective, and metacognitive processes to predict academic performance. Mean differences in beliefs about the utility of effort, in self-esteem, in enhanced reading awareness, and in strategic performance, were used to discriminate achievers and underachievers. A significant discriminant function was found suggesting "that underachievers and achievers differed on the combination of affective, cognitive, and motivational variables" (Carr, Borkowski & Maxwell, 1991, p. 111). The groups differed significantly on measures of self-esteem, reading awareness, and attributions about success. Structural equation modelling results were consistent with the data observed in this study and supported their hypothesis that "underachievers

would differ from achievers in one major respect: Ability would predict attributional orientations for achievers but not for underachievers" (p. 111).

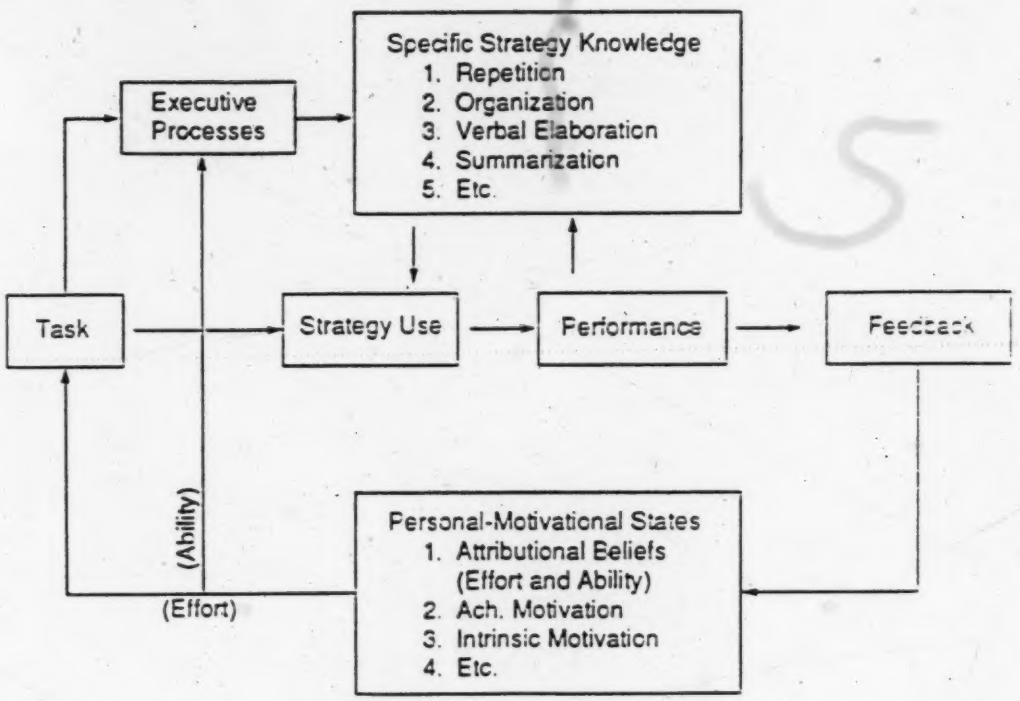
Using their most recent version of the metacognitive-motivational model (Borkowski, Carr, Rellinger & Pressley, 1990) which states that "positive feelings of self-esteem and attributional beliefs about the role of effort contribute to the emergence of a mature metacognitive system" (p. 108), they found support for the position that attributional beliefs and self-esteem are posited to develop from general strategy knowledge. Underachievers in their study "failed to develop an important connection between prior knowledge and internal attributions about self-efficacy" (Carr, Borkowski & Maxwell, 1991, p. 113). Their findings provided support for the causal link between attribution beliefs about the importance of effort and the use of learning strategies reported in previous research with average-ability (Kurtz & Borkowski, 1984) and hyperactive (Reid & Borkowski, 1987) children. Reid and Borkowski (1987) focused on children in grades two, three and four who were experiencing difficulties with impulsivity, attention, and overactivity. Dependent measures included strategy training and maintenance, strategy generalization, and self-attributions, with the students assigned to one of three treatment groups. Results indicated that students in the self-control plus attribution group scored significantly higher than students in both the self-control and strategy control groups on measures of both short-term effects for strategy maintenance and strategy generalization. Additionally, the self-control plus attribution group had "significantly higher attributions of personal causality than the self-control condition... and the strategy control condition (Reid & Borkowski, 1987, p. 301), as well as displaying a greater belief in the importance of effort than did children in the other two groups.

The results of this study led to further refinement of an earlier model

demonstrating the relationship between metacognition and attribution developed by Borkowski, Carr, Rellinger and Pressley (1990). These researchers suggest that the integration of executive processes and attributional beliefs are essential to self-regulatory learning. "As connections among regulation and motivation are formed, a fully integrated metacognitive system emerges. When this system functions properly, motivation drives cognition and, in turn, cognitive actions serve to strengthen motivational beliefs. Furthermore, the most important activity in achieving this reciprocity is not so much strategy-based performance per se but rather decisions to be strategic and remain strategic in the face of problem-solving challenges" (Borkowski & Thorpe, 1994, p. 51).

The model presented by Borkowski and Muthukrishna (1992), as presented in Figure 1, provides a working framework for understanding the various theoretical frameworks which underlie metacognitive development. "The child is initially taught to use a learning strategy, and with repetition, comes to learn about the attributes of that strategy....The child [then] learns other strategies and repeats them in multiple contexts" (Borkowski & Muthukrishna, 1992, p. 484). Children, throughout this process, acquire the ability to attribute both successful and unsuccessful outcomes to effort, with the sense of self-efficacy then serving to energize executive processes. Strategy use, combined with feedback activates personal-motivational states, including attributional beliefs, achievement motivation, and, as well, the intrinsic motivation to learn. All of the components of the model facilitate the development of self-regulated learning (Borkowski & Muthukrishna, 1992).

Figure 1.



Borkowski and Muthukrishna, 1992.

Further research, carried out within the context of the classroom environment, provides additional evidence as to the importance of the integration of both strategy instruction and statements regarding the role attributions and the importance of effortful engagement with academic tasks. Gaskins, Anderson, Pressley, Cunicelli, and Satlow (1993) examined the interactive nature of strategic instruction by teachers, and strategy use, maintenance, and generalization by students at Benchmark School, a private school for bright underachievers. "Instruction at Benchmark attempts to bridge the oft perceived gulf that separates process and content. The two are intertwined. Content objectives are achieved through process implementation" (Gaskins et al, 1993, p. 280). The methodology for a study carried out at Benchmark School involved analyzing the dialogue between six teachers and their students. Results indicated that, in the lessons chosen for analysis, "the teachers initiated guided practice by asking students to use [the] strategy or process while they gave feedback to guide students in successful implementation of the strategy or process...[and] the teachers cued or told students to use (or asked a question about using) previously learned strategies that were not the focus strategy for the lesson" (Gaskins et al, 1993, p. 292).

Additionally, a process-content cycle was analyzed, "a procedure wherein the teacher uses content as a vehicle for discussing the learning-thinking process" (Gaskins et al, 1993, p. 294), with results indicating that this type of interaction between teacher and students is essential for both strategy use and the development of appropriate attributional beliefs. The teachers shared a common teaching model during instruction. "The process objective of the lesson was usually made clear, with information either presented to students or requested of students about how to carry out strategies and why strategies are

important. The teachers modelled the use of strategies and related their personal experiences with strategies. Guided student practice of focal strategies was the norm, as was cuing students to use specific strategies that had been acquired previously" (Gaskins et al, 1993, p. 298). In their summary, these researchers state their belief that the nature of their study promoted both the use of a process approach to instruction as well as enhancing the professional development of the teachers, thus providing a convincing argument for naturalistic research within the context of the regular classroom.

It is clear from the examination and review of these studies, which revealed a necessity for both strategy instruction and attributional statements, since both appear to influence performance of children experiencing difficulty with learning and attentional problems, that further research is warranted. The behavioural characteristics of children who were participants in these studies were such that they hindered effective learning, both in terms of effective and efficient use of strategy use, and in the attributional beliefs that these children held regarding their own learning processes.

In summary, it is important to be able to determine whether children are utilizing the metacognitive knowledge they have or are in the process of developing. Gavelek and Raphael (1985) suggested that the determination of whether the student is doing so should be based on answers to three questions. Is there evidence of monitoring and/or regulating of childrens' cognitive performance? 2) Is individual performance facilitated as a result of such activity? and 3) Is there evidence of such engagement in metacognitive activities across multiple settings? Specific to the last question, it is suggested, due to the difficulty in determining criteria, that "knowledge across settings within a particular content domain" (Gavelek & Raphael, 1985, p. 107) be used as the

evaluative measure.

Students who display attentional problems also demonstrate difficulties in self-regulation. To date, the question with respect to the most appropriate instructional approaches for alleviating the difficulty these students have in their learning has not been extensively examined in the literature. In the following section, the characteristics of these students are first discussed, followed by a discussion of intervention approaches to help facilitate the development of self-regulation.

Characteristics of Students Displaying Attentional Problems

Attention-Deficit/Hyperactivity Disorder (A-D/HD) is defined by the American Psychiatric Association (1994) in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) as possessing a persistent pattern of the essential features of inattention and/or hyperactivity-impulsivity. These features must be prevalent in significant degrees, that is, more frequently and severely than is observed in individuals at a comparable level of development. The syndrome is characterized as involving four core symptoms: 1) distractibility, 2) excitability, 3) impulsivity, and 4) excessive activity in settings where such behaviour is inappropriate.

The current conceptualization of Attention-Deficit/ Hyperactivity Disorder involves three subtypes of the disorder. Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type (AMA, 1994, Section 314.00, p. 80) is the focus of this study. Inattention, manifested in academic or social situations, involves, among other factors, the failure to pay close attention to details in schoolwork, often leading to careless errors, incomplete tasks, and a disorganized approach to academic tasks in particular. Materials needed for assigned tasks are often

carelessly handled, scattered or lost, further exacerbating difficulties in learning and impairing academic achievement. These students are also characterized as daydreaming, spacing out, being in a fog, being easily confused, staring frequently, and being lethargic (Barkley, DuPaul & McMurray, 1990; Lahey & Carlson, 1992). Barkley (1997) has also identified a deficit in the speed of information-processing.

Although estimates of the prevalence of students displaying the characteristics similar to those included in the diagnostic criteria of this subtype of A-D/HD are not accurately available, there is certainly an indication that there is a group of students for whom problems with attention are becoming an increasing concern for a number of reasons.

Included in this set of influencing factors may be the recent trend in North American schools of continually increasing academic level of accomplishment demanded during the school years. This press for achievement which places additional stress on students both in academic and social settings in schools may be a key factor for this group of students displaying attentional problems. Support for this was found by Barkley, Fischer, Edelbrock and Smallish (1990) who stated that these students are likely to receive lower grades on academic subjects and lower scores on standard measures of reading and math.

The student displaying characteristics of inattention introduces a unique problem in the classroom. This is due to the incidence of overactive behaviour, inappropriate attention, and impulsivity when asked to become involved in learning tasks that require voluntary, sustained attention (Schworm & Birnbaum, 1989). Additionally, deHaas and Young (1984) obtained results which indicate that in addition to their difficulty in sustaining attention, these children may also be more constricted than normal children in selecting relevant information from

the environment.

Douglas and Peters (1979) attempted to further explain the behaviour of these children by suggesting that these children suffer from an inability to sustain attention on tasks "that require focused, organized and self-directed effort" (Douglas & Peters, 1979, p. 73). The child who exhibits problems with attention is described as having pervasive difficulties adjusting to the social and academic demands of school.

There are a number of factors which contribute to the attentional problems displayed by students. In assessing the attentional difficulties in an academically underachieving population, it has been suggested that "deficits in the ability to focus and sustain attention in the classroom may lead to decreased academic performance" (Day & Peters, 1989, p. 356). Zentall and Gohs (1984) stated that these children are poor receivers of information that is verbally communicated. They suggested that this occurs as a result of the child's inability to respond to detailed stimulus input rather than global input.

Attention to detail requires a person to narrow and sustain attention in order to focus on attributes. These requirements are facilitated by high levels of arousal. These levels would be difficult for children with attentional problems to attain, since underarousal is a symptom of the ADHD syndrome (Zentall & Gohs, 1984). In previous work, Zentall (1980) stated that due to this insufficient arousal level, the child with ADHD tends to talk and move more (to seek stimulation) and does this more in situations which provide little stimulation.

More recently, Zentall (1993) has suggested that the term attentional 'deficit' is more accurately defined as attentional 'bias'. He supports this interpretation by stating that "an attentional deficit connotes lack of attention, whereas an attentional bias more correctly connotes adequate attention,

memory, and comprehension, but associated with specific tasks, time periods, and conditions" (Zentall, 1993, p. 143). This attentional bias can result in educational deficits. Children with attentional problems are more likely to respond to novel stimuli that are immediately salient. This can result in difficulty during selective attention performance through a failure to focus on relevant stimuli that are less salient, as well as a failure to sustain attention (Zentall, 1993).

Additionally, Zentall (1985a, 1985b, 1986) reported that these children also display an inability to sustain attention when the stimuli are repetitive. This appears to inhibit the development of rote skills, which are necessary for tasks requiring rehearsal or mnemonics (August & Garfinkel, 1990).

There is also evidence to suggest that these children have a wider attentional field than peers who do not display attention problems. That is, they pay attention to peripheral extra-task stimuli (Steinkamp, 1980; Patton, Routh, & Offenbach, 1981). The work of several researchers (Homatidis & Konstantareas, 1981; Tarnowski, Prinz & Nay, 1986; Brenton, 1991) supports this argument toward a susceptibility to distraction. It is further suggested that the fact that these children are poor receivers of "subtle human interactive communication...may contribute to this...attentional preference for salient and global features" (Zentall & Gohs, 1984, p. 78). Listening tasks are, thus, difficult as they require "the ability to select out and attend to a message while ignoring competing (overlapping or contiguous) information" (Zentall, 1993, p. 144). This inability to filter out nonrelevant stimulation appears to result in performance deficits on such tasks.

The ability to sustain attention and concentration to task-relevant stimuli is necessary for learning to take place. Therefore, an inability in these areas is

an impediment to effective classroom learning. Bohline (1985) stated, however, that it is the cognitive impairments of these children, not heightened motor activity, which precludes satisfactory rates of learning.

Several researchers have examined memory and metamemory in children displaying attention problems in order to better understand the cognitive deficits that are demonstrated in tasks requiring problem solving strategies (Voelker, Carter, Sprague, Gdowski & Lacher, 1989; Douglas, Barr, O'Neill & Britton, 1986). They stated that the deficits in the ability to sustain attention may prevent these children from developing and mastering problem solving strategies required for effective learning. As a result they also apply less efficient strategies in approaching memory tasks (Voelker et al, 1989), and are poorer in complex problem-solving (Douglas et al, 1986; Hamlett, Pellegrini & Conners, 1987). However, it must also be pointed out that these children do appear to have normal memory capacity, as well as a normal ability to conceptualize (Plomin & Foch, 1981). The problem appears to be, in large part for these students, the inability to self-regulate their learning, particularly with regard to metacognitive processes.

Metacognitive Processes

Children who display attentional problems appear to exhibit a weakness in metacognitive processes, referred to as executive processes, and do not employ the strategic behaviours necessary to process information as efficiently as do children who do not have such attentional problems. Support for this was reported by Rosenbaum and Baker (1984) in a study which focused on self control skills in a situation where these skills would have to be applied in order to function effectively.

Voelker et al (1989) stated that these difficulties are not the result of lack of skills or knowledge, but rather a lack of effort or use of a strategy during performance of a task. Support for this finding on the part of children with attention problems was also provided by Barkley (1990a) who states that "problems in task performance arise when they must apply executive strategies when approaching a task" (p. 78). Zentall (1988) concurred, finding that the execution of strategies was carried out in an impulsive, disorganized, and relatively inefficient manner.

Students with attention deficits were also found to be less able to communicate the strategies they did use to others (Hamlett et al, 1987). This is seen to be an integral component of the function of executive processes. The combination of all of these deficits clearly points to a deficit in executive function.

Motivational and Attributional Components

Relevant as well is research which concluded that children with attention problems are more externally oriented students, suggesting that their perception of the occurrence of positive and negative events is that they are independent of personal control (Linn & Hodge, 1982; Tarnowski & Nay, 1989). This is to say that children with attention problems demonstrate an external locus of control. In the classroom, then, these children "must be provided with evidence that their behaviour is linked to some environmental consequences" (Linn & Hodge, 1982, p. 593). They must gain more of an internal locus of control in the classroom. As well, Draeger, Prior and Sanson (1986) concluded that these children demonstrate a lack of internal motivation to persist in academic tasks.

Considerable research has been conducted in the area of attention with this population of students. For example, a study by Reid and Borkowski (1987)

examined "antecedent and program-specific attribution training in combination with self-control training on the maintenance, generalization, and long-term assessment of newly acquired strategic behaviours with children identified by teachers as impulsive, inattentive, and overactive" (p. 296). Three groups of grade two, three and four students were compared. A self-control plus attribution condition involved the learning of a sequence of self-instruction statements as well as training designed to enhance self-attributions that were both antecedent and program-generated . A self-control condition "emphasized general approaches to self-regulation and specific strategy training as described for the self-control plus attribution condition.... [while] ... a strategy control condition received strategy training as did the first two conditions but without self-control or attributional instructions" (Reid & Borkowski, 1987, p. 297).

The results of their study indicated that on measures of strategy maintenance and strategy generalization, the self-control plus attribution group scored significantly higher than the other groups on both short- and long-term treatment effects. Attribution effects were significantly higher for this group as well, in terms of both general and specific attributional measures. Children who received the self-control plus attribution treatment had significantly greater general attributional beliefs about personal causality than did children in both the self-control and strategy control treatment groups. This finding provides strong evidence that interventions with children who are underachieving, due perhaps to attention problems, are effective when focussed on "strategy skill training, as well as the affective, motivational beliefs underlying behaviour" (Reid & Borkowski, 1987, p. 305).

Reid and Borkowski (1987) concluded that attributional training that

focuses on conceptualizing one's behaviour as controllable and changeable - through repeated emphasis on the importance of effortful strategic behaviour in producing successes and avoiding failure - is needed for the persistent use and transfer of new skills. In their study with hyperactive children, strategy plus attribution training

> not only influenced the durability of strategy performance but also increased metacognitive awareness about the overall importance of strategic-based performance.... The enhanced metacognitive awareness that resulted from (the) combined attribution and strategy treatment suggests that children who came to use more complex strategic behaviour also acquired corresponding beliefs about the general importance of using strategies (p. 305).

Similar work by Carr and Borkowski (1989) was based on the assumption that these children do not lack the ability to acquire the strategies for effective learning. Rather they lack the understanding that strategic behaviour in combination with effort results in both good short-term performance and long-term academic achievement. Therefore, they proposed that the most effective interventions with this population of learners are those that reshape attributions as well as teach new strategies.

The literature reviewed in this section has dealt with the characteristics of children with attention problems and the learning processes which characterize these children, as well as the inherent problems associated with classroom behaviour. The lack of internal motivation, a demonstrated lack of self control and self-directed effort, a production deficiency in the use of strategies, and an over reliance on external control all contribute to performance deficits in complex cognitive tasks, and thus problems in self-regulation.

The literature review suggests that the metacognitive system of executive processes, and the use of cognitive and metacognitive strategies, as well as

affective/attributional components, are involved in both the knowledge (awareness) and control (self-regulation) of cognition and affect. It appears clear from the literature that the focus of intervention with students displaying attention problems should be on the interaction of this system in generating perceptions regarding task requirements. Implicit is the involvement of generalized knowledge and control schemes, metacognitive strategies, motivational strategies for self-judgments, and acceptance of personal responsibility for learning (in other words, self-regulated learning). These all combine to generate perceptions and expectancies that form the basis for intrinsic motivation to accomplish task requirements and apply appropriate metacognitive, cognitive, and affective learning strategies.

Intervention for Students with Attentional Problems

There are, then, two approaches to be considered when designing intervention with students displaying attention problems. The first of these assumes that once the motivation is present, metacognitive and cognitive processes necessary for self-control (i.e. attention, selection planning, monitoring, self-evaluation and rehearsal) can be utilized. Borkowski and Muthukrishna (1992) argue that it is perceived competence, that is, the affective component, that is the major influence which allows the metacognitive skills to emerge. They state that "a sense of self-efficacy and an enjoyment of learning flow from individual strategic events and eventually return to energize strategy selection and monitoring decisions" (Borkowski & Muthukrishna, 1992, p. 485). The instruction intervention should facilitate the association between the learners' reasons for learning and the deployment of self-regulation (Borkowski & Muthukrishna, 1992).

The second approach is based on the assumption that the metacognitive skills of self-awareness, self-evaluation, and self-regulation provide a basic structure for the development of positive self-control and attributions of success or failure to effort. These perceptions of self control underlie continuing motivation and are reciprocally influenced by perceptions of personal competence or self-efficacy such that both contribute to continuing motivation, perhaps in their effects on feelings of self-worth.

Intervention, therefore, should look at a set of general metacognitive and cognitive skills related to the development of a positive self-system structure and process that are prerequisite to students' ability to assume personal responsibility and control, as well as apply and monitor specific learning strategies. Such a skills training program may be effective in changing negative self-views, attitudes, and orientations toward learning, as well as specific metacognitive and cognitive skills required for self-regulated learning, resulting in learners who seek challenges, overcome obstacles, set realistic goals, and utilize a battery of resources to enable them to approach tasks with confidence (Mulcahy, 1991). Palincsar, David, Winn, and Stevens (1991) describe these learners as autonomous learners who are able to flexibly use the three main kinds of knowledge: knowledge of strategies for carrying out learning tasks efficiently; metacognitive knowledge of their own learner characteristics as well as the demands imposed by tasks; and real world knowledge. These learners also display the motivation to persist when engaged in such learning tasks.

The focus of interventions must not only be on these metacognitive and cognitive strategies to bring about changes in internal processes, but also on helping students change interfering and inhibitory attributional belief systems that are cognitively mediated. As a result, students with attentional problems

may be more able to directly influence their environment and positively adapt to changing instructional conditions. McCombs (1988) delivers a concise summary, stating that the student will benefit from a motivational skills training component with an integrated learning strategies intervention program with a focus on "continuing intrinsic motivation to learn as a dynamic, internally mediated set of metacognitive, cognitive, and affective processes ... that can influence a student's tendency to approach, engage in, expend effort in, and persist in learning tasks on a continuing, self-directed basis" (McCombs, 1988, p. 163).

There are a number of interventions which have a metacognitive instructional focus, taking into account some of the above elements. However, there are no metacognitive and cognitive strategy instructional programs, that the writer is aware of, which also incorporate an attributional training component in conjunction with systematic instruction to develop independent learning and self-regulation. One exception which allows for such integration of affect, attribution, and metacognition is the Strategies Program for Effective Learning/Thinking (SPELT; Peat, Mulcahy, & Darko-Yeboah, 1989). This approach was utilized in this study. A more complete description of the SPELT approach is provided in the Method section of this paper.

RATIONALE

With the growing discontent, both from within the educational community, and from society at large, with respect to the performance of students on achievement tests, there has been an expressed need for the implementation of instructional processes which focus on the development of independent, self-regulated learners. Currently, in many situations, the school environment mitigates against the development of such learners, by frequently asking teachers to teach in an environment that is socially and intellectually isolated and requiring them to stick to the dictates of bureaucracy, and thus maintain the status quo. Additionally, the nature of current assessment processes does not always foster deep learning or encourage the enhancement of higher-order cognitive skills.

To meet these criticisms, there is a need to develop and implement instructional processes that will instill in students a personal responsibility for participation in both the process and the content of learning. This instilling of a belief in students of their responsibility and control for learning, studying, and skill development is a major task which teachers need to address (Mulcahy, Peat, Andrews, Marfo, & Cho, 1992).

Such instructional programming must take place in a learning environment that is currently facing financial constraint, cutbacks to education, and lack of sufficient numbers of resource personnel to provide support to teachers of students with special needs, as well as to the students themselves. With site-based management and the current state of decreased funding on a

student per-capita basis, no longer can many schools provide the option of remedial instruction on a small-group basis for students such as those described as having attention problems. Regular classroom teachers are being required to provide such instruction to an increasing number of students with a variety of special needs without adequate resources or training. With the state of educational change being as it is, the implementation of instructional programming that can be conducted entirely by classroom teachers, to develop students who are active, self-regulated, autonomous learners, is essential.

Students with attentional problems comprise one group of students whose needs with respect to learning and achievement may not be adequately met within the context of the current educational system of inclusion. Given the lack of additional support previously available through resource personnel and materials due to cutbacks in the funding of public education, the need is clearly established to find methods and approaches to facilitate effective learning and achievement for these students.

The purpose of this research, therefore, is to investigate the influence and effectiveness of training in cognitive and metacognitive skills in combination with attribution training on the use, maintenance, and transfer of strategies by children exhibiting attentional problems, and their attributions of success to effort. The prevalence of inappropriate degrees of inattention characterizes the behaviour of these children, resulting in pervasive difficulties in adjusting primarily to the academic demands of school. The difficulties these children experience on learning tasks requiring voluntary, focused, reflective, and organized sustained attention, as well as self-directed effort are seen to be a result of the attentional problems. These difficulties, combined with an inability to monitor and self-regulate their thinking and learning processes, contribute to

performance deficits on complex cognitive tasks.

The short-term effects of the intervention are examined in this study. The performance of children exhibiting attention problems is measured by their use of strategies when engaged in academic tasks, their use of the concurrent verbalization think aloud procedure to guide their strategic behaviour, and their self-reported attributions for success in learning.

The long-range implications of this type of intervention look very positive. Students become aware of their thinking processes and the utility of strategy use within the context of the regular classroom, without the aid of extra resources and funding. Classroom teachers realize that this type of instructional programming is feasible given the current state of education at this time. As well, accountability, which has become a major focus for teaching professionals, is addressed in a practical, theoretically sound, and pragmatic way.

The ideal setting for such an intervention program, focusing on a combination of attribution and motivational skills enhancement, and metacognitive strategy training is the classroom, as this is the natural environment in which children do most of their academic learning. It is important to carry out research of this nature in the context of the natural environment of the classroom rather than in an experimental or contrived controlled setting with a group of students who display attention problems because these students may do quite well in a one-to-one controlled situation and only display inattentive behaviour once they return to the classroom (Barkley, 1990b).

As Burcham, Carlson and Milich (1993) pointed out, however, the overwhelming majority of studies with this population of students have been carried out in controlled settings, such as hospitals or university clinics. Fuchs

and Fuchs (1990) stated that only a few school-based research studies have contributed to more effective practice in general and special education. In addition, Fiore, Becker and Nero (1993) found that investigators, in a search for effective educational interventions with these students, were able to collect few data on interventions in public school classrooms. Their finding was that "clinical psychologists, neuropsychologists, and physicians conducted most of the reported research in laboratory or clinic settings (including clinic-based classrooms) only 21 of the 137 studies reported on interventions in actual classrooms" (Fiore, Becker & Nero, 1993, p. 163-164). These researchers also stated that if their review had been limited to studies conducted in actual schools, there would have been little, if anything, to report.

It is not only important then, but absolutely necessary, to observe and work with these students in the regular classroom, realizing that one has to give up a significant amount of experimental control, making it somewhat more difficult to conclude with absolute certainty the nature of cognitive change and what has affected the change. Despite this limitation, such classroom research is essential, as little research of this nature has been initiated with this population of children in the context of the regular classroom.

STATEMENT OF THE PROBLEM

In order to address the purpose of this study, the following questions are investigated with regard to changes in academic performance and achievement as well as changes in attributional beliefs which affect motivation and self-regulation in children with attentional problems.

1. What are the short-term changes, as a result of metacognitive and cognitive strategy training plus motivation/attribution training, on the strategic performance and achievement in reading comprehension and writing within the content area of language arts for children who display attentional problems?

2. How does attribution/motivation plus metacognitive strategy training affect the attributions of children with attentional problems with regard to beliefs about self-efficacy and the use of strategies, and the importance of effort, indicated through Think Aloud protocols, A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom and the Self-Perception Profile for Children?

3. What is the feasibility of implementing metacognitive and cognitive strategy training plus motivation/attribution training in the regular classroom within a whole-school context given the current state of educational change?

CHAPTER THREE

METHOD

The identification and selection of subjects for the study began after the research request was approved by the school district. A pilot study was conducted beginning in four elementary schools, and then subsequently limited to two schools, during the 1993-1994 academic school year. The following year, in 1994-1995, the main study was conducted in one of the elementary schools where the pilot study had been carried out.

Method of Subject Identification

Classification of subjects for both the pilot study and the main study involved the same two step process. The first step involved initial teacher nomination and identification of a large pool of students who appeared to display characteristics of attentional problems. The second step was directed at selecting the target sample from the pool using more objective measures.

For the pilot study, the initial identification phase was carried out at four elementary schools during the time period from late September to the end of October 1994, prior to intervention implementation. In the main study, this same process was completed in the time frame from late September to the end of October, 1995, again prior to implementation of the intervention.

Teachers in the four elementary public schools, who had agreed to participate in the study, were asked to nominate students in their grades five and six classrooms who demonstrated difficulty with attention to the extent that it interfered with and inhibited their learning. Similarly, the following year, four participating teachers in the one elementary school where the main study was to be carried out completed the same nominating process. The study initially began with the nomination of twenty-six students, and this number was subsequently limited to nine students at the grade five and six level. It should be noted that no girls were nominated by participating teachers. A focus on this age range was appropriate as it is at at this age that students have attained a level of cognitive maturity to benefit most efficaciously from an intervention program of this nature (Brown, 1978).

The reduction in the number of students from the initial twenty-six to the nine who actually participated in the study was due to several factors, including, first of all, the teaching staff recommending that, although certain students met the criteria for inclusion in the study, it was felt that these students were already dealing with other factors at the time of the study Another factor was the lack of parental permission for students who were initially nominated. Finally, some of the nominated students did not meet the criteria when assessed using the identification instruments.

The second step involved the administration of several assessment instruments to further, and more completely identify, describe, and select the group of students drawn from the original pool. These were the students who, if they met the requirements in terms of attentional problems, would become participants in the study.

During the second step of the classification process, once parental

permission for students' participation in the study was obtained, the nominating teachers were, in November, asked to describe each student's self-control behaviours in terms of his level of inattentiveness and impulsivity in the classroom using the Conners Teacher Rating Scale-39 (CTRS-39; Conners, 1973).

Description of Identification Instruments

To ensure the accurate description of the students' attentional problems on a quantitative basis, as well as to enable the identification of characteristics indicative of such attentional problems in terms of hyperactivity, inattention, impulsivity and auditory attention, four assessment instruments were used with each student. Each instrument was administered by the investigator individually with students.

The Conners Teacher Rating Scale-39 (CTRS-39; Conners, 1973) is a behaviour rating scale that has, for the purposes of this study, utility in assessing hyperactivity and attention problems in children between the ages of three and seventeen, focusing on both stable and enduring characteristics of children being assessed (Barkley, 1990a). The CTRS-39 was used for two reasons. First, it permits teachers to assess, systematically, a student's overall behaviour pattern in the classroom. Second, it provides a separate assessment category for inattention. This is an important category for assessment, as it relates directly to the attentional problems displayed by the students in this study. The reliability of the CTRS-39 has been well documented. Test-retest reliability scores over a one-month period range from .70 to .90 across factors, with reliability coefficients ranging from .35 to .57 over a one-year interval (Barkley, 1990a). Concurrent validity has been suggested through findings of significant

correlation with other scales, including the Child Behaviour Checklist (Achenbach & Edelbrock, 1983) and the Behaviour Problem Checklist (Arnold, Barnebey & Smeltzer, 1981).

To further ensure the accurate selection of students who display characteristics indicative of attention problems, the Stroop Color and Word Test (Golden, 1978) was individually administered to each student by the investigator. The Stroop Color and Word Test is comprised of word reading, colour naming, and naming the colour of the ink with which the colours are written (Stroop, 1935). This test is designed to be a measure of selective attention for children displaying characteristics of inattention and learning disabilities. It attempts to measure inhibitory processes at the time of responding to the visual stimuli in the test (Das, Naglieri & Kirby, 1994).

The standardized version of the original version of the Stroop Test consists of three pages each with a 5 by 20 matrix of items.

> Page 1 consists of the words "Red," "Green," and "Blue" arranged randomly and printed in black ink on a white 8 1/2 by 11 sheet of paper. No word is allowed to follow itself within a column. Page 2 consists of 100 items, all written as "XXXX", printed in either red, green, or blue ink....Page 3 consists of the words on Page 1 printed in the colours on Page 2. (Golden, 1978, pp 8-9).

The Stroop Color and Word Test yields three basic scores. Basic scoring involves a count of the number of items which are completed in a 45 second time period as well as errors made during that same time period for each of the Word Score, the Color Score and the Color-Word Score. A Word Score involves the number of colour words read correctly within the given time period, while a Color Score involves the number of colored bars identified within the time period. Finally, a Color-Word Score involves the correct reading of the

color in which a word is presented, with the color to be identified being different than that of the color-name of the word. The reliability of the Stroop scores is reported to be highly consistent across different versions of the test (Golden, 1978). Jensen (1965) obtained reliabilities of .88, .79 and .71 for the three raw scores. Reliabilities of .86, .82, and .73 were reported for the individual version (Golden, 1975).

Another test, the Selective Auditory Attention Test (SAAT; Cherry, 1980) was also administered. The SAAT was designed to enable the identification of "children whose selective auditory attention deficits may interfere with their academic achievement" (Cherry, 1980, p. 1). Due to the nature of characteristics displayed by students with attention problems, it was necessary to assess the nature of selective auditory attention for the students participating in this study. Based on a diotic mode of presentation, the test has two parts, a list of monosyllabic words recorded in a quiet mode, providing a measure of auditory discrimination in the absence of background noise (referred to as non-competing), and an equivalent list of words recorded with a semantic distractor -- an interesting story (referred to as the competing score), thus providing a selective attention score. The lists of words were taken from the Word Intelligibility by Picture Identification (WIPI) test (Ross & Lerman, 1971). The SAAT was administered using a tape recorder with dual headphones in a quiet room by the investigator.

The vocabulary subtest of the Wechsler Intelligence Scale for Children, Third Edition (WISC-III; Wechsler, 1991) was also individually administered by the investigator to describe subjects' general verbal ability. The age range of the subjects for both the pilot and main studies was within two years and all subjects were in grades five and six for both studies.

The results obtained on the CTRS-39, Stroop, SAAT, and Vocabulary Subtest of the WISC-III were scored by the investigator. Each assessment instrument took approximately one-half hour to administer. The total sample excluded students receiving stimulant drug treatment, as well as children identified as having other diagnosed impairments to learning, such as a reading or other learning disability, or visual or auditory impairments. The sample also excluded children receiving resource room services. This exclusionary selection was necessary to allow a focus on the attentional problems these children displayed in the classroom and to avoid the issue of comorbidity of syndromes. The selection of children on the basis of attention problems allows for a parsimonious design for the study. From an initial pool of twenty-six students nominated by teachers, a total of nine students were selected who met the criteria for inclusion in the study.

Description of Pre- and Post-Intervention Instruments

Several instruments were administered on an individual basis by the investigator with students both prior to and following intervention implementation. Pre-intervention assessments were carried out during late November and December, while post-intervention assessments were conducted during the month of June, allowing for an intervention period of approximately six months. These assessment instruments enabled the documentation of changes both in achievement and performance levels as well as affective/attributional components of the students' learning. All instruments were administered on separate testing occasions in the same room at the school.

The Learning Process Questionnaire (LPQ, Canadian edition) developed

by Mulcahy & Biggs (1990) is a 36 item, self-report questionnaire designed to address students' approaches and orientations to learning. The questionnaire focuses on students' attitudes toward their studies and usual ways of learning in school and the questions cover most aspects of school work. The LPQ yields scores on three basic motives for learning, those being surface, deep, and achieving and the same three levels of learning strategies. "The student's approach to learning is a composite of a motive and an appropriate strategy" (Mulcahy & Biggs, 1990, p. 2). Resulting profiles "represent an individual's general orientation to learning that is a composite of motivational states and strategy deployment that is relatively consistent over situations" (Mulcahy & Biggs, 1990, p. 3).

Students rate themselves on a 5-point Likert scale with each item being a self-report statement of a motive or strategy. The six subscales each contain six items derived from three strategy and three motive subscales. Approach scale scores are obtained from the sum of the related motive and strategy subscales. Likewise, summing Deep and Achieving or Surface and Achieving scales yields a composite Deep-Achieving/Surface-Achieving scale score. Table 1 provides a description of the three main approaches involving motives and strategies as presented in the subscales underlying the LPQ.

Statistical information for the LPQ was obtained from a sample of secondary students in Australia in 1979 (Biggs,1987). Internal-consistency coefficients for subscales range from .45 to .78 with test-retest reliability coefficients for the subscales ranging from .49 to .70. Scale scores were reported to relate to student performance in consistent ways. Table 2 presents norming data that have been collected for the Canadian edition of the LPQ with means and standards of LPQ subscale, scale and composite scores available

for fourth- and sixth-grade students in Alberta.

The LPQ was administered individually on a question-by-question basis with the investigator reading aloud with the student to ensure complete understanding of the response options, and to minimize problems caused by reading and attention difficulties.

Table 1 Motive and Strategy in Approaches to Learning and Studying

Approach	Motive	Strategy
SA: Surface	Surface motive (SM) is to meet requirements minimally; a balancing act between failing and working more than is necessary.	Surface Strategy (SS) is to limit target to bare essentials and reproduce them through rote learning.
DA: Deep	Deep motive (DM) is intrinsic interest in what is being learned; to develop competence in particular academic subjects.	Deep strategy (DS) is to discover meaning by reading widely, inter-relating with previous relevant knowledge, etc.
AA: Achieving	Achieving motive (AM) to enhance ego and self-esteem through competition; to obtain highest grades, whether or not material is interesting	Achieving strategy (AS) is to organize one's time and working space; to follow up all suggested readings, schedule time, behave as 'model student'.

Table 2 Means (M) and Standard Deviations (SD) of LPQ Scores for 4th and 6th Grade Students in Alberta

	Grade Four (N=165)		Grade Six (N=168)	
Subscale				
Surface				
Motive	19.51	(4.89)	18.16	(4.42)
Strategy	18.65	(4.16)	17.40	(3.81)
Deep				
Motive	21.61	(4.73)	22.79	(3.38)
Strategy	20.93	(4.56)	21.16	(3.46)
Achieving				
Motive	21.16	(4.15)	21.64	(4.10)
Strategy	21.35	(4.47)	22.01	(3.85)
Scale				
Surface	38.16	(7.10)	35.56	(6.83)
Deep	42.54	(8.33)	43.95	(5.56)
Achieving	42.52	(7.46)	43.65	(6.50)
Composite				
Surface-Achieving	80.67	(11.89)	79.21	(9.50)
Deep-Achieving	85.06	(13.81)	87.60	(10.36)

Note: Standard deviations are in parentheses.
(Cheng, 1993).

When students were unsure of a response, they were encouraged to think out loud about their thoughts to help them make their choice. Students were told that the purpose of the LPQ was to find out about how they feel about school and how they go about learning when they are in school. Students were assured that their answers would be confidential and they did not have to worry about answering the way they thought their teachers or others might want them to. As well, students were encouraged to answer as honestly as they could and it was emphasized that there were no "right" or "wrong" answers to the

questions.

The Metacognitive Reading Awareness Questionnaire (MRAQ; Cheng, 1993) is designed to assess students' knowledge of reading and comprehension monitoring, as well as perceived goals and motives of reading. This instrument was selected to assess student's general knowledge base of comprehension, since the chosen academic content area of language arts involves an awareness of, and utilization of, strategies for reading and formed the basis for the intervention program. It was also expected that this instrument would yield results that would indicate a level of change based both on strategy use and in belief systems and attributions that underlie strategy use. The MRAQ was presented to individual students in a quiet room at the school using the structured interview format with twenty open-ended questions Students were seated opposite to the investigator with a small table in between. The students were told that the purpose of the interview was to find out what they thought about reading and themselves as readers. Similarly to the LPQ, students were assured that there was no right or wrong answers to the questions on the MRAQ, and that answers were confidential.

The development of the MRAQ (Cheng,1993) involved the examination of both a structured metacognitive interview and a similar questionnaire format, looking at the correlation between performance on both types of format. Essentially the same results were found for both formats. Twenty open-ended interview questions were developed from the previous studies (Garner & Kraus, 1981-82; Kirby & Moore, 1987; Myers & Paris, 1978; Neyrinck, 1986; Paris & Jacobs, 1987) and were divided into two components. Component one consisted of five questions that were designed to address the goal-motive component of comprehension monitoring, while component two consisted of

fifteen questions designed to provide insight into the knowledge component of comprehension monitoring, with this second component being further divided into person, task/text, and strategy categories (Cheng, 1993). The MRAQ is an experimental version based on a scale developed by Paris and Jacobs (1984). This original three-stem version was expanded into a five-stem version by Cheng (1993). Tables 3 through 6 provide means and standard deviation on the various components of the MRAQ for skilled readers.

The scoring system used in the present study followed the same procedure established by Cheng (1993), with categories of responses established for each interview item using an ordinal scale of 0, 1, 2, 3, and 4. "Zero (0) was assigned for "don't know" or irrelevant responses. One (1) point was given to responses that focused on general or mechanical aspects of reading comprehension. Two (2) points were given to responses with one relevant, but not the most critical, explanation or strategy of reading. Three (3) points were credited for responses reflecting increasing appreciation of reading goals, text structure or strategies. Four (4) points were assigned for answers that include most important aspects of effective reading comprehension" (Cheng, 1993, p. 91). In the present study, scores on the MRAQ were summed to give a total score. This was viewed as more reliable than using individual score components, because as the number of items included in the score is increased, reliability is increased. See Appendix H for the Interview Format Scoring Scale for the MRAQ.

To avoid problems on the MRAQ associated with reading difficulties and attention problems, the investigator read the questions with the students who were looking at their own copy of the questions. The questions were given in the same order to all students, and those questions that were not understood

were explained or rephrased until the student felt able to respond. Brief responses were very carefully queried for elaboration to give further insight into students' thoughts and perceptions about their reading. Probing for elaboration was carefully pursued to avoid inferring answers. Administration of this questionnaire took about thirty minutes for each student.

To determine the reliability of the scoring procedure for the present study, an independent scorer with no information about the subjects was asked to score the interview protocols for all nine participants in the study. Inter-rater reliability was determined using the formula suggested by Miles and Huberman (1984, p. 64). The proportion of agreement between the researcher and the independent scorer was .91. The inter-rater reliability coefficient was above the acceptable level (90%) of inter-coder agreement recommended by Miles and Huberman (1984).

Table 3 Means (M) and Standard Deviations (SD) of Mean Scores for Goal/Motive Component and Its Five Items for Skilled Readers

		Interview Format
Component:		
Goal/Motive	M	3.06
	SD	0.55
Items:		
Like Reading	M	3.41
	SD	0.50
Dislike Reading	M	3.35
	SD	0.32
Self Good Reader	M	2.76
	SD	1.30
Self Poor Reader	M	2.62
	SD	1.27
Reading Goal	M	3.14
	SD	0.99

Table 4 Means (M) and Standard Deviations (SD) of Mean Scores for Person Category and Its Five Items for Skills Readers

		Interview Format
Category:		
Person	M	2.97
	SD	0.41
Items:		
Better Reader	M	2.83
	SD	0.71
Age	M	3.38
	SD	0.82
Wealth	M	2.86
	SD	0.69
Arithmetic	M	2.76
	SD	0.99
Good Reader	M	3.00
	SD	0.54

Table 5 Means (M) and Standard Deviations (SD) of Mean Scores for Task Category and Its Five Items for Skilled Readers

		Interview Format
Category:		
Task	M	3.05
	SD	0.46
Items:		
First Sentence	M	3.59
	SD	0.57
Last Sentence	M	3.10
	SD	1.08
Length	M	3.14
	SD	1.36
Skim	M	2.72
	SD	1.25
Task Difficulty	M	2.69
	SD	0.89

Table 6 Means (M) and Standard Deviations (SD) of Mean Scores for Strategy Category and Its Five Items for Skilled Readers

		Interview Format
Category:		
Strategy	M	3.35
	SD	0.54
Items:		
Difficult Word	M	3.28
	SD	0.75
Difficult Sentence	M	2.76
	SD	1.21
Evaluation	M	3.24
	SD	1.24
Image	M	3.66
	SD	0.67
Rereading	M	3.79
	SD	0.41

The Self-Perception Profile For Children (Harter, 1985), designed for use with students in grades three through six, contains 36 items contained within six separate subscales tapping five specific domains, as well as global self-worth. The five specific domains addressed are those of Scholastic Competence, Social Acceptance, Athletic Competence, Physical Appearance and Behavioral Conduct and measures children's self perceptions in these domains. The sixth subscale measures one's sense of global self-esteem or self-worth. This scale is a revision of the Perceived Competence Profile for Children (Harter, 1979, 1982) reflecting an increased focus on children's perceptions of themselves rather than primarily on competence. This scale provides the basis for the creation of a profile for each student, underscoring the "view that the examination of differences in an individual's scores across the various domains

of his/her life provides the richest and most accurate picture of one's self-concept" (Harter, 1985, p. 5). The Self-Perception Profile for Children was administered orally by the investigator with each individual student to ensure that students considered all choices for each question and were not confused by the "structured alternative format" (Harter, 1982, p. 89).

This scale was chosen because of its appropriateness for the ages of the students in this study and also because of its good construct validity and reliability. Reliability data were obtained from four samples of boys and girls ranging from grade three to grade eight. Internal consistency reliabilities for the six subscales obtained from Samples A, B, and C totalling 1311 sixth through eighth grade students ranged from .80 to .85 with a mean of .82 for the Scholastic Competence subscale, from .75 to .80 with a mean of .78 for the Social Acceptance subscale, from .81 to .86 with a mean of .84 for the Athletic Competence subscale, from .76 to .82 with a mean of .80 for the Physical Appearance subscale, from .73 to .77 with a mean of .75 for the Behavioral Conduct subscale, and from .78 to .84 with a mean of .81 for Global Self-Worth. Similarly, reliability (internal consistency) for the same subscales from Samples C and D totalling 531 third through fifth grade students was reported to average .81, .75, .81, .78, .72, and .78 respectively (Harter, 1985).

A second scale was also used to determine the level of intrinsic motivation each student demonstrated in his school work. A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom (Harter, 1980) contains 30 items which delineate "five dimensions of classroom learning which could be characterized as having both an intrinsic and extrinsic motivational pole" (Harter, 1980, p. 5). The dimensions of Challenge, Curiosity/Interest, Independent Mastery, Independent Judgment and Internal Criteria and their

counterparts (i.e. working to obtain teacher approval and grades, as well as dependence on the teacher for guidance) are measured in terms of classroom learning as this is "a situational context in which the motivational orientation of the child would be particularly relevant" (Harter, 1980, p.5). Factorial validity for this scale is reported to be .53, .50, .46, .50, and .54 for each of the five subscales, Preference for Challenge, Curiosity/Interest, Independent Mastery, Independent Judgment and Internal Criteria for Success. Reliability scores (KR 20 internal consistency) were reported to range from .78 to .84, .68 to .82, .54 to .78, .72 to .81 and .75 to .83 for the Challenge, Independent Mastery, Curiosity, Judgment and Criteria subscales respectively. Test-retest reliability was reported to range from .58 to .76 after a five-month period, and .48 to .73 after one year (Harter, 1981).

The Reading Comprehension subtest of the Canadian Achievement Test, Level 16, Form A was also used as a pre- and post-intervention assessment measure. This instrument was chosen in order to assess how the students performed in terms of achievement relative to general curriculum demands and expectations in reading, since reading is the major component in the language arts content area, and combined with writing, formed the basis for the intervention program. The Canadian Achievement Test (CAT) (McGraw-Hill Ryerson, 1983) consists of batteries measuring skills in reading, language, mathematics and using reference materials. The CAT is widely used in school systems and is easily administered. The CAT was normed on 76,000 Canadian children of different backgrounds, from grades one to twelve. The reliability estimates, Kuder-Richardson Formula 20, for levels 14 to 19 of the CAT for reading comprehension range from 0.85 to 0.91.

The use of concurrent Think Aloud protocols was also used in the pre-

and post-assessment of students' academic behaviour, in an attempt to document students' attributional beliefs. As Ericssen and Simon (1980) point out, the use of verbal reports as data helps researchers to understand the course of cognitive processes. Concurrent verbalization, specifically, permits the documentation of information that is verbalized as it is being attended to. By probing with minimal instruction, as was the procedure used in the present study, a direct trace is obtained of the heeded information and an indirect trace is obtained of the internal stages of the cognitive process (Ericssen & Simon, 1980), including as well, possible attributional statements made by students as they were engaged in academic tasks. Although as Ericssen and Simon (1980) point out, introspective reports as data do not have any privileged status as direct observation, they are a valid and reliable data collection instrument.

Additional measures were incorporated to permit the documentation of change in students' performance and achievement levels. Information from the students' academic progress reports in the Language Arts content area for the reporting period immediately prior to intervention implementation as well as immediately following intervention was recorded. As well, other language arts curriculum based assessments administered in the classroom by the teacher as part of the on-going regular curriculum were used to assess student performance immediately prior to and following intervention. One such criterion based assessment measure was the Highest Level of Achievement Tests (HLATs). These tests were developed by the local school board to be administered as part of an attempt by the local school board and administration to provide a standardized measure of achievement across schools within the district. The HLAT for writing in the content area of language arts was used for purposes of this study, as this was the only HLAT developed at the time. For

the writing of the HLAT test, students are given a set topic, a prompt, and a defined period of time in which to plan, write, edit, and produce a final copy of a piece of writing. Teachers are provided with scoring criteria and grade each student's work on the basis of grade level and proficiency within grade level. HLAT results are used as part of the reporting student progress process at the end of the academic year.

Information was gathered from progress reports for the content area of Language Arts. The Language Arts content area includes both reading and writing for a variety of purposes. Student achievement is measured in terms of four achievement levels: A - Work meets standard of excellence (considered to be above 80%); B - Work exceeds acceptable standard (considered to be between 65% and 79%); C - Work meets acceptable standard (considered to be between 50% and 64%); and D - Work does not meet acceptable standard (considered to be below the 50% mark). Students are also evaluated in terms of their effort with corresponding comments ranging from excellent, satisfactory, is improving, needs improvement, to inconsistent.

The above pre-post assessments are directly curriculum relevant and permitted documentation of the expected outcome measures toward increases in achievement level and effort.

Description of the Intervention Program

The Strategies Program for Effective Learning/Thinking (SPELT; Peat, Mulcahy, & Darko-Yeboah, 1989) was used for the strategy training component of the intervention. The SPELT model is a three-phase continuum of instruction which attempts to systemize what type and sequence of instruction to use when teaching cognitive strategies in regular classrooms using customary materials

(Mulcahy, Marfo, Peat, & Andrews, 1987). This approach is based on the assumption that learners are involved as active participants in a constructive process that involves the use, and management, of cognitive processes. Unlike models of cognitive and metacognitive instruction which focus on teacher assigned and imposed instructional systems, with little opportunity for students' active participation in monitoring and evaluating their own implementation of strategies taught, the SPELT approach "utilizes a model of instruction in which the student is ultimately given the responsibility of determining if a strategy is needed, what strategies are appropriate, and how to generate, implement, and evaluate them in a way that maximizes problem solution" (Mulcahy, 1991, p. 387).

The SPELT instructional approach involves a progression through three phases of instruction. Phase I, the lowest level of strategy acquisition is teacher imposed. The methodology involves the direct teaching of cognitive and metacognitive strategies, with the goals for this phase being the building of a repertoire of strategies, as well as the development of an awareness in students that there are benefits inherent in using the strategies for more effective learning.

In Phase II, the focus is on the transfer and generalization of strategies introduced and taught during Phase I. This transfer and generalization, across various settings and content areas, is carried out through the use of Socratic dialogue, as well as such instructional techniques as paired problem solving, think aloud, and cooperative groups, where learning is dynamic and interactive. In addition, students are encouraged to "develop explicit understanding of tasks, strategies, and their own motives, feelings, and beliefs regarding these" (Mulcahy, 1991, p. 388). Students are encouraged to modify and extend their

own use of strategies.

Phase III, the highest level, involves student self-generation of strategies. Students, by this phase, have developed a knowledge base of cognitive and metacognitive strategies, as well as procedures for using the strategies. This is also combined with the awareness of where, when, and why the strategies should be used. During this phase, content material is provided to students with minimal teacher guidance as to how to complete the task. Throughout the progression from Phase I, through Phase II, and ultimately to Phase III, the teacher increasingly takes the role of a mediator, to assist students "in becoming increasingly more in control of the learning process leading them ultimately to autonomous learning" (Mulcahy, 1991, p. 387).

The rationale for choosing this model is based on the belief that intervention is most effective when it is carried out in the context of the child's learning environment. The SPELT model is designed for such an approach, as it is focused on intervention within the regular classroom, by the regular classroom teacher. As well, SPELT is designed to be used throughout the entire school day in all content areas, using conventional materials contained in the curriculum. (See Mulcahy, Marfo, Peat, & Andrews, 1987 for a more complete description of the instructional approach.)

The affective component of the intervention, focusing on attributional beliefs held by the students and motivational factors affecting or influencing students' involvement in their learning, was designed to enhance general beliefs about the importance of effort in performance and success on academic tasks. The students received continuous appropriate feedback from their teachers about their effort and engagement in assigned academic tasks. Examples of the types of attributional feedback statements provided to the

students include comments such as, "You've been working hard, and look how much you've accomplished." and "What do you think has helped you be successful on this task?" or questions such as, "Do you feel this strategy has helped you in your hard work? How?"

Students were also encouraged to model statements such as "I (you) got it right. I (you) tried hard, and did a good job." "No, I didn't get it quite right, but that's O.K." Effort attributions were also facilitated through statements such as "I've (you've) been working hard and I'm (you're) good at this." Attributional feedback emphasized both ability and effort, and were linked to both antecedent attributions and program specific attributions (Carr & Borkowski, 1989). Ability attributions were incorporated for correct answers, effort attributions were offered for incorrect responses, and encouragement statement were provided for both correct and incorrect responses on tasks (Bryan, Bryan & Dohm, 1994).

These comments were designed to link past and present achievement with effort and strategy use, and to reinforce the role of effort. The goal of this type of feedback was to stress to the students the importance of continued effortful behaviour in their learning. These intended attributions were included as daily feedback presented not only to students in the study individually but also to these students within group settings in their classrooms, as well as to all other students in the class, as part of daily instruction in all subject areas.

The goal of the attributional training component, then, was to intervene in the failure cycle, addressing three factors. These factors were the use of inadequate strategies, immature self-control, and negative attributional beliefs, to facilitate beliefs that, by focusing on effort, would be durable, transferable, and generalizable.

Instructional Setting and Program Implementation

Initial intervention implementation for the study began in late December 1994, in the four identified classrooms. Once the students were identified, the four grade five and six classroom teachers received a one day training session conducted by the investigator in the use of SPELT. This formal group training session was followed up with weekly informal meetings with each participating teacher in the respective schools regarding which strategies were being implemented and evaluation of how the implementation was being carried out in the classrooms.Students began to receive metacognitive strategy training plus attribution and motivation training directly from the classroom teachers, supplemented by support from the investigator provided to the teachers, within the context of the regular classroom.

Very early during the initial study it was realized that time and travel constraints were going to interfere significantly in the process of accurately collecting and recording relevant data. With there being only one investigator, it was going to be impossible to actually be physically present in each of the classrooms often enough to document strategy implementation and record the interactions between the teachers and the students. As a result, in late January of 1995, the decision was made to reduce the number of participating schools and teachers to two.

It also became clear in the early stages of the initial study, that in order to gain a complete picture of student strategy use, as well as effectively document changes in attributions and thoughts about learning, the procedures being used to observe students' academic behaviour as they were engaged in learning tasks was not going to allow the recording of student thought processes.

Additionally, conditions necessary to complete a full analysis of the interactions in the classrooms were not being met. For example, although the teachers were thorough and precise in the implementation of SPELT, it was the realization of the investigator that procedures had not been identified, and resources were unavailable, that would allow an effective documentation of what the students were actually doing and saying as they worked with the strategies in the classrooms. The move from observing to direct interaction on the part of the investigator, in order to record students self-statements as they worked, was necessary.

Additionally, although the feedback from teachers was provided to students, it was not being done on a continuous or intense enough basis for students to see the link between the strategies they were using and the attributions they held regarding effortful behaviour. It was decided that the investigator needed to become directly involved with the students, working in a team approach with the classroom teachers.

From the experiences gained during the initial study implementation, then, it was realized that rather than merely observing the teachers and students in the classrooms, there would have to be much more interaction on the part of the investigator with the students themselves. This led to the rationale for the main study that would take place within a whole school implementation. The focus could then be placed on one school and give the investigator the time required to document the processes at work on the parts of both the students and the teachers involved.

The participating school was an elementary school encompassing grades one through six as well as an Early Childhood Services program. Enrolment for the 1994-95 school year was approximately 300 students. The

school is located in a primarily middle-class professional neighbourhood in a large urban centre in Alberta, Canada.

Previously, during the 1993-94 school year, concern was expressed at this school regarding the adjustments made in curriculum programming to cover the additional instructional time incorporated into the school year. The additional time had been allotted to the drama and art components of the Alberta curriculum. Despite the value inherent in these subject areas, it was felt that there was a pressing need to support student achievement which was not happening with the extra time being given to drama and art. It was felt that there was the need for a program that would support the work that was going in the individual classrooms.

In the spring of the 1993-94 academic year, the principal and teachers at the school made the decision to implement a whole-school program for the teaching of cognitive and metacognitive strategies. This decision was made during the time when the initial study portion of this research was being conducted at the school. Staff members chose to call this program Skills for Thinking And Research (S.T.A.R.) to facilitate feelings of ownership for the program undertaken. The S.T.A.R. program during this first year of implementation was clearly based on the SPELT approach to learning. One teacher was identified to be the S.T.A.R. teacher for the following school year, to coordinate the implementation of the program. This teacher was to be responsible for initially developing and implementing, and nurturing the program on a school-wide basis.

The investigator worked very closely with the teacher, on a continual basis, both prior to implementation of the program and throughout the first year of its development, to ensure both the success of the students and of the

program itself. Throughout the time-frame of the main study, monthly meetings were held between the teacher and the investigator to discuss the implementation processes in the program, and to evaluate both the teaching of the strategies and attribution statements and feedback provided to the students. Additionally, following the completion of the intervention, formal semi-structured interviews were conducted with both the school principal and the teacher. The following types of questions were asked to identify common themes and concerns throughout the whole-school implementation process.

> How and why did the S.T.A.R. program come into existence?
> What did you see as your role in the development of the program?
> Were there key elements that enabled the program to be successful?
> What were your observations as the program developed?

Beginning in September of the 1994-95 school year, students in all grades one through six classrooms received forty minutes each week in direct instruction of cognitive and metacognitive strategies. The first segment of instruction, conducted prior to implementation of the cognitive and metacognitive strategies intervention, encompassed the learning of pre-skills that would lead to the actual introduction of the cognitive and metacognitive strategies to help them in their learning. The focus of instruction was the language arts content area, including both reading and writing. This was also the focus content area for this study.

The first month was spent teaching library skills and facilitating student practice of such skills to better prepare the students for active engagement in the use of strategies once they were introduced. Following this, a series of strategies were directly taught and students were given opportunity to work with these skills directly in the form of a research assignment. Beginning in

November, the first strategy introduced was the "Stop, Yield, Go" strategy from the SPELT program. Following this, in the months of late December through to January, the following strategies were introduced in chronological order: "RAP" and "RIDER" for reading comprehension, and the Research Model, a network strategy incorporating "The IDEA Diagram" for organizing research projects. The steps taught included mind mapping (or 'webbing'), classifying into outline form with subtopics (using the IDEA Diagram), note taking, rough draft, editing, and final draft. Following this, in late February, the "COPS" strategy was introduced for the editing of written work, and "THE IDEA DIAGRAM" was transferred to the area of creative story writing. Additionally, the concurrent verbalization 'Think Aloud' procedure was introduced to students as a strategy to guide their use of the actual cognitive and metacognitive strategies as part of the intervention implementation. (See Appendix I for a full description of all strategies introduced to students during the entire academic year).

Once the initial strategies were solidly in place, as described in Phase I of the SPELT program, students began to apply what they had been taught by preparing a group project. Work on this major project encompassed the time from late November 1994 to late January 1995. The decision was made to base this first project on a practical, real-life, fun situation. This decision was designed to motivate the students to begin using the strategies they had been taught, while having fun learning. The topic of this first project was to research, investigate, and put together a ski-trip for a family of four. The students were given a budgetary limit and a time frame for the ski-trip. Beyond these two constraints, students were given free rein to design what, in their opinion, was to be the ultimate family ski-trip. All students in grades five and six in the school participated in this project, with students identified as participants in the actual

study being closely monitored by the teacher and the investigator. The groups of students were expected to show a paper-trail documenting their use of the strategies they had been taught, as well as the procedures and processes they used to complete the plan for their ski-trip. This paper-trail consisted of a mind-map illustrating how group members began the pre-planning process for their trip, a chart documenting how their planning was divided into sub-topics, how the work was divided among group members, resources they used in the planning process, a rough draft of their trip in chart form showing itemized details of all components of the trip, a revised draft showing the process of editing, and, finally, a good copy of their planned ski-trip.

In early January, the work the students had put into their projects culminated with the submission of a completed plan, followed by oral presentations. Classmates were invited to discuss each other's plans and provide feedback to each other as each plan was presented.

This initial group project was followed by an individual research project on a topic of each student's choice. Consistent with the whole-school context for the program intervention, all students in the grade five and six classrooms discussed their choices with the S.T.A.R. teacher or the investigator with regard to feasibility and scope of the topic. Particular attention was paid, by the investigator, to those nine students actually participating in the study.

Transfer of the use of the strategies to the regular classroom was facilitated through discussion and communication with the classroom teachers. The classroom teachers were made aware of the strategies by the S.T.A.R. teacher, through discussion and modelling, and were encouraged to make an effort to ensure that the use of the strategies was incorporated into students' daily work in the regular classroom.

Throughout the entire time during which both the group and individual projects were being completed by all students, those students participating in the study were monitored closely, on an individual basis, by the investigator. This was done through the use of "Think Aloud," where the students were encouraged to verbalize their thought processes and their use of strategies aloud as they worked. This was accomplished by the investigator sitting with the students as they worked either individually or in a group situation, and prompting the students, if necessary, to do all of their thinking out loud. These self-statements were recorded verbatim by the investigator.

Additionally, both the S.T.A.R. teacher and the investigator, and eventually also the classroom teachers, provided feedback in terms of effort attribution statements to the students. This feedback was provided continuously and consistently by the S.T.A.R. teacher and the investigator through the use of questioning and prompting with the students. For example, as students were working on an assignment using one of the strategies they had been taught, the teacher or the investigator would ask questions like, "Is this strategy helping you to complete the activity?" or "Why do you think you are being successful in making progress with this assignment?" Similarly, through statements like, "See how your hard work and effort is paying off.", the students were helped to attribute their success to effort.

The length of observation and interaction sessions by the investigator was determined by the type of activity in which each student was involved during a S.T.A.R. session or in the regular classroom. During these sessions, the students' thoughts were recorded in written form by the investigator. Everything the students said to themselves and to others when working in a group situation, as well as statements made by the teacher to the students, was

written down verbatim. These qualitative observations were designed to provide a "window" into the students' thought processes while engaged in academic tasks using the strategies in which they were trained. Similarly, the types of attribution feedback provided by the teachers were recorded in the same manner.

Although there are limitations inherent in the use of this procedure, namely the heavy demands on students' verbalization ability, and possible processing disruption (Garner, 1987), the results can help to further the understanding of the monitoring processes used by students.

An average of nine hours per week was spent in the three grade five-six classrooms and/or the S.T.A.R. room. The average length of each observation and/or think aloud session during the six-month intervention period was thirty minutes. The length of the session, as well as the type of recording that was done, either through think aloud or observation, was determined by the nature of the activity in which the students were engaged.

The following section will present the results with respect to students' scores on the assessment instruments used to describe the identifying characteristics of the subjects participating in the study. Additionally, scores on the pre- and post-intervention assessment measures are discussed to determine and explain changes in students' achievement and performance during the course of intervention implementation.

CHAPTER FOUR

RESULTS AND DISCUSSION

The results will be presented and discussed in the following order. First, the characteristics of the group of students involved in the study will be presented, including their age, grade, Conners Teacher Rating Scale-39 (CTRS-39), and WISC-III Vocabulary Subtest scores. Next, students' scores on the Selective Auditory Attention Test (SAAT) and Stroop Colour and Word Test will be presented. These scores will be used to describe the characteristics of the students.

Following this, the results obtained from the pre- and post-intervention instruments will be presented and discussed. These include the Metacognitive Reading Awareness Questionnaire (MRAQ), the Canadian Achievement Test (CAT) Reading Comprehension Subtest, the Learning Process Questionnaire (LPQ), the Self Perception Profile For Children, and A Scale of Intrinsic Versus Extrinsic Orientation In the Classroom.

Next, excerpts from sessions with students using the Think Aloud procedure are presented and discussed, followed by an examination of teachers' anecdotal comments on student progress reports, results of the Highest Level of Achievement Test in writing, and results of the attributional component of the intervention.

Finally, results of the interviews with the school principal and S.T.A.R.

program teacher are presented and discussed.

Description of Group Characteristics

With respect to the description of the subjects, Tables 7 and 8 provide the results of the assessment instruments used to identify the characteristics of the group of students who participated in the study.

Table 7 Student Group Identifying Characteristics

Student	Chronological Age	Grade	CTRS-39 (T-score) Inattentive-Passive	WISC-III Vocabulary (Scaled Score)
1	11.1	6	61	13
2	11.4	5	67	9
3	11.6	6	57	9
4	10.9	5	59	7
5	11.5	6	61	11
6	10.1	5	71	9
7	11.3	6	62	6
8	11.3	6	57	14
9	10.4	5	71	12
	(11.1)		(62.9)	(10)

(Note: Means are in parentheses.)

The mean age of the students was 11.1 and all nine students were in either grade five or six. All students were described by their teachers as having attentional problems in the classroom, with a mean score for the group on the Inattentive-Passive subscale of the Conners Teacher Rating Scale of 62.89 (SD = 5.48). Increasing scores on this subscale are indicative of increasing levels of inattention. Three of the students scored in the 'slightly above average' range (a score of 56 to 60), while three of the students scored in the 'above average' range (a score of 61 to 65). One student scored in the 'much above

average' range (a score of 66 to 70), and two students scored in the 'very much above average' range (a score of 71 and above). A score of 65 and above on the Inattentive-Passive subscale is considered clinically significant.

The group mean score on the Vocabulary Subtest of the WISC-III was 10.00 (SD = 2.7). All of the scores on this subtest were within the low average to high average range.

Table 8 Student Group Identifying Characteristics

Student	SAAT	STROOP		
	Non-Competing/Competing	Word Score	Colour Score	Colour Word Score
1	100% / 48%	87	53	21
2	100% / 32%	85	41	30
3	100% / 76%	84	63	48
4	100% / 64%	85	55	43
5	100% / 48%	87	56	34
6	100% / 44%	65	45	24
7	100% / 36%	72	48	26
8	100% / 68%	74	56	36
9	100% / 88%	78	63	53

The mean score for the group on the Selective Auditory Attention Test (SAAT) was 55.1% for the 'competing list'. The comparison mean for the 'competing list' for normal eight year olds is 79.4%. In the present study, all but one of the subjects scored below the comparison mean.

Group mean scores for the Stroop Color and Word Test were as follows: Stroop Word Score = 79.2 (SD = 7.61), Stroop Color Score = 53.3 (SD = 7.53), and Stroop Word and Color Score = 35.0 (SD = 11.08). Table 9 presents norms for the Stroop Color Word Scores.

Table 9 Stroop - Color Word Scores

Student	# of words in 45 seconds (present study)	Time to complete all 100 items	
001	21	3:36	(3.6 min) 214.0 seconds
002	30	2:30	(2.5 min) 150.0 seconds
003	48	1:36	(1.6 min) 93.8 seconds
004	43	1:45	(1.7 min) 104.7 seconds
005	34	2:12	(2.2 min) 132.4 seconds
006	24	3:06	(3.1 min) 187.5 seconds
007	26	2:54	(2.9 min) 173.1 seconds
008	36	2:06	(2.1 min) 125.0 seconds
009	53	1:24	(1.4 min) 84.9 seconds

Norms taken from Descriptive Statistics of Expressive Attention Scale (Das & Naglieri, 1993).

Word Name Score
10 - 11 year old normal subjects Mean Time 25.88 seconds (SD = 21.77)

Colour Name Score
10 - 11 year old normal subjects Mean Time 35.15 seconds (SD = 22.28)

Colour Name Suppress Word Score
10 - 11 year old normal subjects Mean Time 60.67 seconds (SD = 29.00)

The Metacognitive Reading Awareness Questionnaire

The MRAQ was used to assess students' awareness and perceived use of appropriate strategies to aid them in their comprehension. The intervention was designed to focus on making students more evaluative and planful in their approach to academic tasks, particularly reading and writing. Changes in their use of strategies would, therefore, be expected to be reflected in the students' awareness of their use of strategies.

In order to determine whether there were any significant changes from pre- to post-intervention with respect to student's metacognitive reading awareness ability, a within subject repeated measures ANOVA was carried out, using the MRAQ pre-and post-test (time) score as the repeated factor. Results of this analysis indicated significant differences with regard to students' metacognitive reading awareness pre- to post-intervention ($MS = 122.7$, $F = 11.059$, $df = 1,8$, $p \leq .01$).

There was a significant increase in students' metacognitive reading awareness with a pre-intervention mean of 55.33 and a post-intervention mean of 60.56. This was expected because of the nature of the intervention, where strategies were introduced and their efficacy reinforced as students worked on their independent and group research projects throughout the intervention period. The nature of the measurement was designed to assess students metacognitive reading awareness as a result of strategy use. This is an important change as it demonstrates that students appear to become more aware of the strategies they might use as they read. This change was likely due to the intervention, because as students become familiar with strategies such as 'RAP' and 'RIDER' for comprehension monitoring, their awareness of the utility

of the strategy when combined with effort attributions increases. Due to the fact that these strategies were introduced to the students during intervention, it is likely that the increased metacognitive reading awareness was due to the intervention, although it is not known for certain due to a lack of clear controls.

Reading Comprehension (The Canadian Achievement Test)

To determine whether there were any significant changes from pre- to post-intervention with respect to students' achievement level in reading comprehension, a within subject repeated measures ANOVA was also carried out using the Canadian Achievement Test (CAT) Reading Comprehension subtest pre- and post-intervention scores as the repeated measure. Results of this analysis indicated significant difference with regard to students' reading comprehension achievement scores ($MS = 180.5$, $F=8.208$, $df = 1,8$, $p \leq .021$).

There was a significant increase in students' reading comprehension achievement scores with a pre-intervention scaled score mean of 518.1, and a post-intervention mean of 524.4. This was expected because of the nature of the cognitive and metacognitive strategies which were introduced to the students. The RAP and RIDER strategies are both primary strategies designed to increase students' comprehension of reading passages, so it would be expected that the increased ability to effectively utilize these strategies would facilitate an increase in reading comprehension. Additionally, it would also be expected that the introduction and use by the students of the COPS strategy for editing might also aid in reading comprehension, as, used appropriately, the COPS strategy facilitates a more thorough interaction with what students have written.

The combination of significant increases on both the MRAQ and the CAT

scores is important as it reveals that not only were students more aware of their reading strategies, it may be that they were also able to use this awareness to engage more successfully with reading material in terms of reading comprehension achievement level. It may also be the case that the students became more flexible in their use of strategies, thus demonstrating generalization and transfer from classroom use of strategies during independent research, to performance on a standardized reading comprehension assessment measure. It is also important to note that change was noted on a standardized measure, not just on classroom-based or teacher-based measures. Additionally, changes in students' perceptions of positive change in their use of strategies, observed through their ability to maintain focus and avoid distractions while working, as well as their positive feelings toward their work, may be due to the instruction provided during the intervention.

A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom

In order to determine whether there were any significant changes in students' orientation in the classroom, indicated by a change from pre- to post-intervention from an extrinsic to more intrinsic motivation, a repeated measures ANOVA was carried out, using pre- and post-scores on A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom as the repeated measure. No significant differences were observed on any of the subscales on this instrument. This is not surprising, given that the instrument measures five components, these being challenge, curiosity/interest, mastery, judgment, and criteria for success/failure. These are considered to be stable dimensions of students' learning over time. What may be the case is that as students feel an increased level of confidence in their ability to make accurate judgments about

their work, they may then begin to positively anticipate activities and tasks that challenge them. This, in turn, may lead to later significant increases in the three remaining components of students' learning that are measured by this instrument. An increased level of self-judgment may, in other words, lead to a preference for challenge. This may, ultimately, lead to greater success and more intrinsic motivation to learn in the classroom, with students attributing success and failure on academic tasks to effort.

As students are able to demonstrate a heightened level of self-judgment, as well as greater awareness of the utility of effort-related strategy use, their increased feelings of self-competence may lead them to seek out additional challenges willingly and positively. This observation is supported in the work of Dweck (1986) who stated that students who hold an adaptive ("mastery-oriented") pattern of achievement behaviour display challenge seeking and high-effective persistence. Also, according to Ames (1992) these students appear, in their increasing attempts to self-regulate their learning, to enjoy putting forth effort in their pursuit of mastery on a particular task.

The Self-Perception Profile for Children

In order to determine whether there were any significant changes in students' self-perceptions, indicated by a change from pre- to post-intervention in the five domains of scholastic competence, social acceptance, athletic competence, physical appearance, and behavioral conduct, as well as global self-worth, a repeated measures ANOVA was carried out, using pre- and post-scores on the Self-Perception Profile for Children as the repeated measure. No significant differences were observed on any of the subscales on this instrument.

Assessment of Strategy Application and Performance

The observation of students' use of the concurrent verbalization Think Aloud procedure was designed to provide insight into whether the students could, and did, use the strategies they had been taught. This procedure was utilized in an attempt to demonstrate how strategy use guided academic behaviour when students were involved in either reading for information purposes or in creative or research writing.

The following are excerpts from sessions where students in the study were working either in groups or individually with strategies in a variety of situations. In an attempt to explore the individual differences with respect to the impact of the metacognitive and cognitive strategy instruction, three students who showed significant change in their use of strategies and also attributions were chosen from the group of students who participated in the study for more in-depth examination. These indications of substantial change were measured through scores on the MRAQ, CAT, and as well, through the Think Aloud observation sessions. Similarly, two students who didn't show change were also selected. Both the students who were more successful and those who were less so were chosen to differentiate between students' level of performance. It was anticipated this might allow for a better explication of the results of strategy instruction.

Classroom teachers' comments on student progress reports, as well as results achieved by the students on the HLAT writing achievement test are included in the discussion of each student. The teachers' comments on the progress reports, including both achievement categories and anecdotal comments, were considered to be an integral component for measuring change

from pre- to post-intervention both in terms of students' use of strategies in reading and writing and their ability to self-regulate their learning.

For each of these five students, three sessions were selected for illustrative purposes. One session was chosen from early in the intervention during the month of February, a second from the middle of the intervention time period during late March and early April, and the third from late May, during the final stages of the intervention. During these sessions, all student verbalizations were recorded by the investigator in note form. Each student has been assigned a pseudonym for these transcribed sessions.

The first three students who are described are students who demonstrated, through their behaviour, a positive change in their ability to increasingly use a strategy, or combination of strategies, to regulate their own learning. The first set of observations involves a student with the pseudonym John. John was ten years old, and in grade five. His score on the vocabulary subtest of the WISC-III was 12, and he scored 88 percent on the competing list on the SAAT. His score on the CTRS-39 was 71, and he achieved grade equivalent scores of 4.7 and 5.6, corresponding to scaled scores of 513 and 530 respectively, on the reading comprehension subtest of the CAT from pre- to post-intervention. His pre- and post-intervention scores on the MRAQ were both 64. With respect to the Learning Process Questionnaire, John changed in his use of a surface motive to learning, showing a decrease in scores from 12 to 6 from pre- to post-intervention. Similarly, he demonstrated a decrease in the use of a surface strategy approach to learning with scores of 14 and 11. His scores on both deep motive and deep strategy were consistently high both prior to and following intervention, with scores of 23 and 22 for deep motive, and 18 and 20 for deep strategy respectively. John's scores for achieving motive and

achieving strategy remained fairly consistent, with scores of 15 and 13 from pre- to post-intervention for achieving motive and 19 and 18 for achieving strategy. Results of John's changes in motives for learning are presented in Figure 2. The results of changes in strategies for learning are presented in Figure 3.

In this first excerpt involving John, which occurred early in the intervention, he is editing a story he has written, with another student watching to learn how he uses the 'COPS' strategy. At this point in the intervention, it was necessary for the investigator to prompt John's use of the strategy.

> John: "O.K. I went through my story checking for capitals. What does "O" stand for? I forget."
> Investigator: "What do you think it might stand for?" (the story is held up for both students to look at as a prompt).
> John: "Oh, yeah, organization and overall appearance." The student makes two edit notes where he will begin a new paragraph, and centres the title. He then proceeds: "What does the "P" stand for? Oh, I know, periods and stuff."
> Investigator: "Yes, punctuation. I'm pleased you're remembering what the letters stand for. Good effort."
> John: "But I did that already when I checked my paragraphs for organization."
> Investigator: "The idea of separate letters and four readings of your story is to do what?"
> John: "To catch all the errors. O.K., I'm reading my story again for "P". I'm catching some spelling mistakes too, and then I'll read it again for spelling. O.K., now I'm done punctuation and I'll do spelling. I've already done spelling but I'll do it again." The student continues to read his story aloud and asks for help to spell 'sewer'.
> John: "I'm going to type it now."

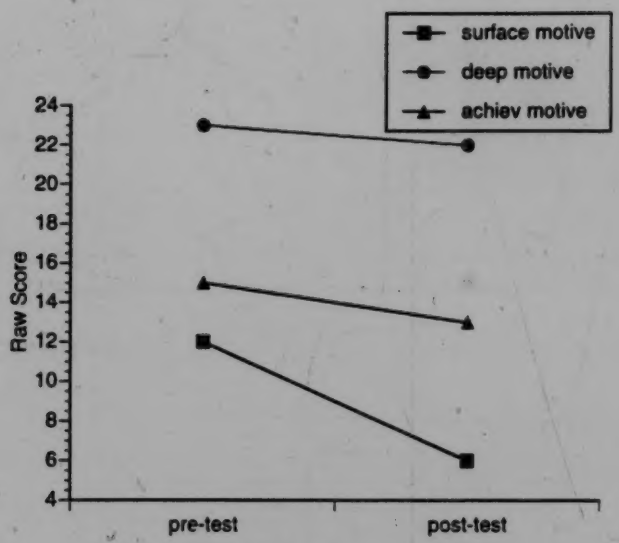


Fig. 2 Changes in motives for learning (John)

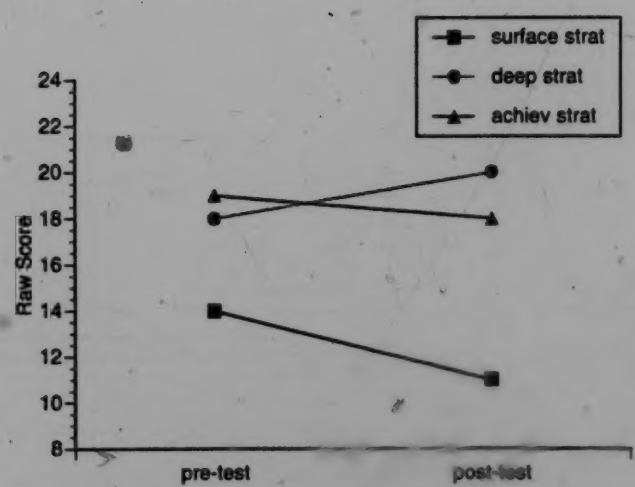


Fig. 3 Changes in strategies for learning (John)

This first excerpt demonstrates that John is able, with prompting, to effectively use the strategy to edit his work. He also appears able to use the verbalization of his thought processes to help guide his behaviour.

In this second excerpt, which was taken from the six-week time period of the intervention, John is using the RIDER strategy, followed by the COPS strategy, to complete a piece of creative writing. He is speaking to the investigator as he begins this session involving the editing of a piece of creative writing.

> John: "But first, can I tell you a story? You know I've had a special story in my head since I was small and I keep adding to it in my head. I told myself I'd never write it down on paper until I could do a good job."
> Investigator: "What are you telling me?"
> John: "That I'm ready. This stuff really has helped me."
> Investigator: "How do you feel the strategies have helped?"
> John: "I'm more confident that I can do it now."
> Investigator: "That's wonderful. I'm pleased that you can see how using the strategies, plus working hard have paid off for you. Well done." At this point, John, without prompting, used the reading comprehension strategy, RIDER, to complete his piece of creative writing, and then was able to make the necessary editing corrections.

Appendix J provides an actual work sample of John's application of the COPS strategy.

It is apparent from this example, that John not only has become increasingly proficient at using the RIDER strategy, he is able to transfer its use from reading to creative writing, enabling him to visualize a story as he is writing it. Additionally, and perhaps more importantly, John's feelings of self-confidence and self-competence are emerging to the point that he feels capable

of now writing, on paper, a story he has been thinking about for several years. It is these kinds of attributional statement patterns and feelings of self-competence that are fundamental components in facilitating a student's success in school.

In this third excerpt, John is using the COPS strategy to self-correct a piece of writing for his individual research project. During this session, John worked unaided and unprompted to use the strategy. The student's Think Aloud statements were as follows:

> "OK, what does 'C' stand for? O.K., capitals. I have so many commas and no periods. I'm correcting it now using the 'P'. I like to be organized. I need to do them in order. O.K. I'll do capitals first." The student, at this point, worked through unaided to correct several capitalization errors. "O.K., now how do periods need to be added?" Again, the student worked consistently and diligently to find several places where commas needed to be changed to periods to avoid run-on sentences. "Now, I'm working on overall appearance. This needs to be typed on the computer now, so that it looks good."

It is apparent from these excerpts that John became increasingly capable with use of the Think Aloud procedure to successfully use the strategies he had learned. This enabled him to begin to more effectively self-regulate his own learning.

John's progress report for the language arts content area following intervention indicated that he was meeting the acceptable level of achievement in language arts and his effort in this content area was excellent. This had not been the case prior to intervention, when his effort was reported to be satisfactory, and he was noted to be having some difficulty with grade level reading material. In the progress report it was noted that he was now able to

work independently with grade level material, which also had not been the case prior to the intervention period. In terms of effort and attitude, the classroom teacher also noted an increase in both responsible behaviour and a more positive attitude toward learning over what was reported prior to intervention. Whereas prior to intervention, John had often struggled with the mechanics of writing, producing short pieces of writing with few details and numerous errors, results from the year-end HLATs in writing indicated that this student's achievement was 'at grade level' with 'adequate proficiency.'

The next set of observations focus on Paul. Paul was eleven years old, and in grade five. His score on the vocabulary subtest of the WISC-III was 9, and he achieved 32 percent on the competing list of the SAAT. His score on the CTRS-39 was 67, and his pre- and post-intervention scores on the MRAQ were 34 and 39. His grade equivalent scores on the reading comprehension subtest of the CAT were 4.0 - 4.3, corresponding to scaled scores of 496 and 502, from pre- to post-intervention. Results on the LPQ indicate that Paul's reliance on surface motive and surface strategy decreased from pre- to post-intervention. His scores for surface motive decreased from 19 to 13 while surface strategy scores decreased from 19 to 10. Additionally, Paul's scores for deep motive and deep strategy increased, with scores on deep motive increasing from 21 to 24 and scores on deep strategy increasing from 17 to 22. Similarly, his scores on achieving motive and achieving strategy increased from 21 to 24 and 18 to 22 respectively. The results for Paul of changes in motives for learning are presented in Figure 4, while changes in strategies for learning results are presented in Figure 5.

This first excerpt occurred early in the intervention period and revealed the following self-statements expressed by Paul. At this point he had completed

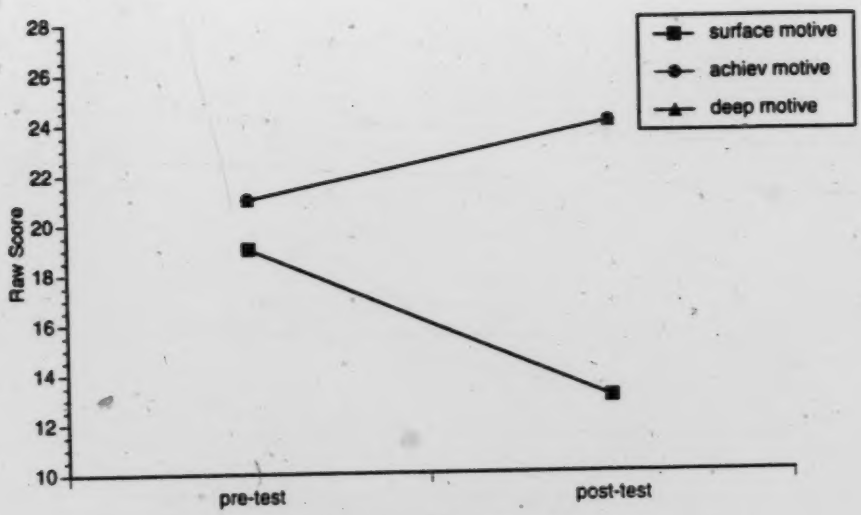


Fig.4 Changes in motives for learning (Paul)

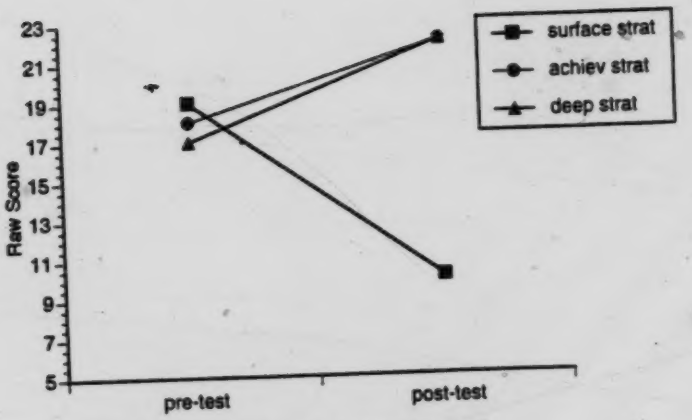


Fig.5 Changes in strategies for learning (Paul)

the first draft of a piece of creative writing, and he is beginning to edit the story using COPS.

> Paul: "This is my story and I've added the final sections to it so now I'm ready to COPS my story. O.K. now - capitalization. I am going through the story and I will stop at each capital letter to make sure it should be capitalized."

Paul then proceeded to read aloud and justify correctly the use of capitals in an entirely self-regulated manner. The student made one 'O' (organization) correction while editing for capitalization because what he had written didn't make sense. Paul then continued with the "S" for spelling stating "O.K., I need to check these words to make sure they are spelled correctly and whether [these] ones need capitals." A very important self-statement made during this session by the student was "It's going to get easier to write good stories because I can use this strategy to find my mistakes." This is important because Paul's perceptions that writing will become easier for him may lead him to become more actively engaged in the writing process, and ultimately he will experience increased enjoyment and satisfaction from writing. This type of attributional statement had been made by the teacher during the initial introduction of the strategy, and subsequently reinforced as students began to use the strategy. However, at the time when Paul made this particular statement, it had not been prompted by either the teacher or the investigator.

In this next excerpt, occurring midway through the intervention period, Paul is again using the COPS strategy. This excerpt demonstrates how he is able to reason why he is doing something while he is doing it. This is a positive indicator of Paul's increasing ability to use a strategy, as, prior to intervention,

he was less able to articulate what strategies would work for him.

> Paul: "When I edit, I read out loud because it helps me concentrate. It also helps to see if it makes sense." This statement was made while the student was editing a story he had written the previous day.

Appendix K contains a work sample of Paul's creative writing, showing the paper trail for the writing process.

In this third excerpt, which occurred toward the end of the intervention, Paul and another student are working on a science problem-solving activity involving density of liquids, again using Think Aloud. This time, however, they are using thinking out loud as a strategy, in and of itself, to guide their behaviour as they complete the assigned task.

> Paul: "What questions do we need to ask? That's what we need to know first."
> Student #2: "I'm sure of my predictions. I drew a diagram, so let's get going."
> Paul: "Let's see, you couldn't taste it. You couldn't smell it. I could see it."
> At this point, both students continued to stay focussed and work through the procedure.
> Student #2: "Now conclusions. We need to keep checking back in my book to see how it is done."
> Paul: "Let's see...is it O.K. if you wanted to put which one is in the bottom?"
> Student #2: "Yes, I think so."

Another excerpt from later during the same observation session, involved a different science activity. This excerpt demonstrates that Paul was becoming

quite proficient in using Think Aloud statements to guide his independent behaviour. He also demonstrates the ability to provide effective feedback and guidance to his peers, based on his own think aloud processes.

> Paul:"We have to make a siphon work. You guys have any ideas?"
> Student #2: "I don't know what to predict so I don't know what to do." (expressing frustration).
> Paul: "If you don't know what to do, draw a web and that will give you any ideas. If you think of something, you can write it down."
> Student #2: "I think I've figured it out. If you change the level of the water or..."
> Paul: "...we need a longer straw. When we write our procedures, we have to start from where we poured the liquids into the cups."

Throughout these activities, Think Aloud statements reinforced the students' ability to stay focussed and on-task without any assistance or prompting from either the teacher or the investigator. This ability had developed during the intervention program, as the students had not demonstrated this skill prior to intervention.

Progress report results for Paul indicated that the teacher felt that he had become more responsible for his own behaviour and learning during the time frame of the intervention. It was reported that he listens well and does his best to produce work which meets grade level expectations. Only occasionally was he now distracted during class. In language arts, his work met acceptable level and his effort was reported to be excellent. He is able to read grade level material and participate in discussions of what was read. Growth was demonstrated in all areas of language arts. The end-of-year HLATs in writing results indicated that this student was 'achieving at grade level' with 'limited proficiency.' There was, from the classroom teacher's perception, a significant

improvement both in the length of the piece of writing and the quality of writing over what the student had produced prior to intervention and what the teacher had expected of this student

David is the third student who demonstrated significant change in his use of strategies, as well as attributional statements. David was eleven years old, and he was in grade six. David's score on the vocabulary subtest of the WISC-III was 13, and his score on the competing list of the SAAT was 48 percent. He scored 61 on the CTRS-39, and his scores on the reading comprehension subtest of the CAT were 5.6, corresponding to a scaled score of 530, both pre- and post-intervention. Pre- and post-intervention scores on the MRAQ were 47 and 62. David's scores on the LPQ were interesting, in that his scores for surface motive and surface strategy both increased, from 12 to 16 for surface motive and from 10 to 15 for surface strategy. This may have been offset by his consistent scores for deep motive and deep strategy which remained at 24 for deep motive and 20 for deep strategy both pre- and post-intervention. His scores for achieving motive increased from 13 to 15, while his achieving strategy scores decreased form 18 to 14. The results for David of changes in motives for learning are presented in Figure 6. Changes in strategies for learning results are presented in Figure 7.

The first excerpt which focuses on David, required him to use his personal judgment with the task of completing a set of materials for a game board based on his individual project.

> David: "Right now I'm drawing empty spaces for my game board. I know I need my star. I have seventeen cards so far and I want forty.
> Investigator: "Do you have instructions?"
> David: "No, I'm concentrating on the game board first, and then I will do the instructions after."

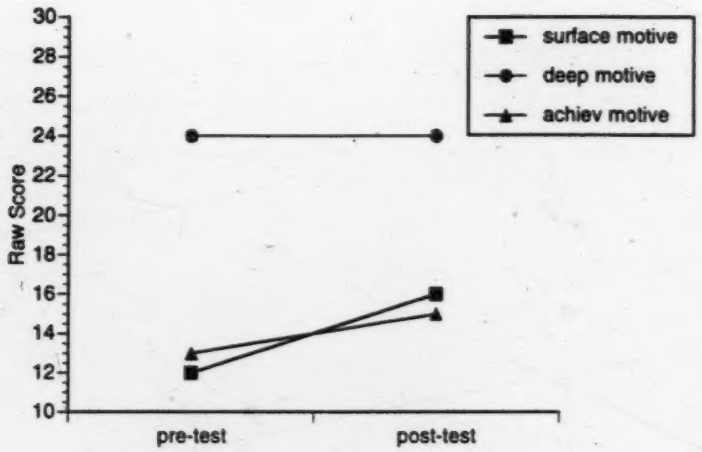


Fig. 6 Changes in motives for learning (David)

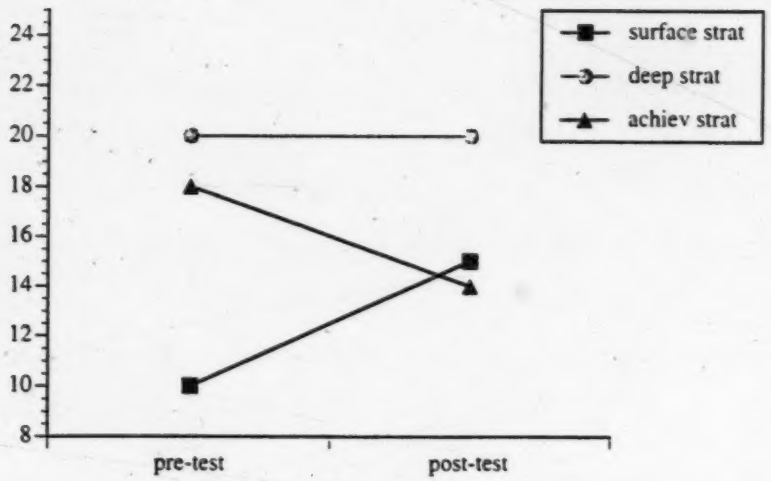


Fig. 7. Changes in strategies for learning (David)

David, during a session occurring midway through intervention, was able to use the RAP strategy in the following way: "I'm circling words that are going to give me trouble. I'm asking myself questions as I read." This student tried out various options and self-corrected as he was reading. He rehearsed out loud his reading and was very pleased with the end result of this session. At this point, David stated, "I'm going to make a homework list in my journal to help me with my reading tonight."

One of the more amusing incidents in the 'think aloud' sessions conducted by the investigator was when David was approached as he worked and he asked as soon as the investigator sat down "Do you want me to use Think Aloud now?" which he then proceeded to do.

This same student, David, on a subsequent session with another student, also occurring midway through the intervention implementation, was involved in a story-editing process. The dialogue went as follows:

David: "I'll explain my pre-plan to you."
Student #2: "This is an excellent mind map. But you didn't give enough details on how you got from the helicopter into the waterbed."
David: "I didn't give the 'problem' enough detail."
Student #2: "Yes, what were the specifics?"
During yet another editing session, the dialogue continued on the piece of writing by the student.
Student #2: "You didn't give all the 'wants."
David: "I didn't get that far. I do have a resolution though."
Student #2: "What is a resolution?"
David: "It's the end - how the problem is resolved."
Student #2: "Let's do it all again and make more suggestions to each other."
It was at this point that the teacher debriefed with all the students in the

class, asking such questions as "What is going well in your group?" and "What kinds of problems are you encountering?" To these questions she got responses such as "We're helping each other with better ideas." "Some kids didn't finish the pre-writing yet." "Some kids didn't use the prompt." "Some kids are goofing around." After this debriefing, the students moved back into pairs and continued to work on their stories. A second interactive session between the teachers revealed that discussion during the first debriefing enabled the students to be even more successful as they continued.

> Teacher: "Did it go better the second time?"
> Student: "Yes, because we are getting more experienced."
> Student: "Practice makes better."
> Teacher: "What were some of the differences?"
> Student: "The first time through we gave compliments and asked questions but the second time we asked harder questions."
> Teacher: "You were able to criticize constructively better?"
> Student: "Yes, but some people weren't open to suggestions."
> Teacher: "Why do we need others?"
> Student: "We need a partner to go over our stories with us, because if it's material we're familiar with, we might overlook things, so we need others to provide feedback."

This excerpt involving David and the other students in the classroom was chosen because of its importance in demonstrating the nature of type of interaction between the teacher and the students that is essential to facilitate growth in students' use of metacognitive and cognitive strategies. This dialogue is also important to address students' attributions of success to effort. Both of these components serve to increase students' ability to self-regulate their learning.

The year end progress report for David indicated that he was achieving or exceeding the acceptable level in language arts. Of particular note was the comment that his confidence had grown in his ability to learn material. The teacher commented that he was a good thinker. It was also noted that he readily accepted challenges within the grade level program and was not afraid to take risks in his learning. The observation, by the classroom teacher, that he was able to work more cooperatively, was also noted on the progress report. HLATs results for writing post-intervention indicated 'achievement at grade level' with 'proficiency.' The teacher also commented on the S.T.A.R. program noting that this student used the RAP strategy to avoid copying directly from reference material when writing for information purposes. It would appear that David was becoming proficient at using a reading comprehension strategy to aid him in his writing, thus demonstrating evidence of generalization and transfer of the strategy.

Not all subjects participating in the study appeared to benefit from the intervention. The first student described who did not demonstrate as much success in terms of strategy use, the use of Think Aloud to guide their use of strategies and overall self-regulation of his learning during the intervention is Stewart. Stewart was ten years old and in grade five. His score on the vocabulary subtest of the WISC-III was 9, and he achieved 44 percent on the competing list of the SAAT, which is the second lowest score of all subjects participating in the study. His score on the Stroop Color and Word Test was also the second lowest. His score on the CTRS-39 was 71, which was the highest score of all participants, and his reading comprehension grade equivalent scores on the CAT were 4.3 to 4.5, corresponding to scaled scores of 502 and 507, from pre- to post-intervention. Pre- and post-intervention scores

on the MRAQ were 50 and 57. Stewart's scores on the LPQ reflected little change from pre- to post-intervention. His scores for surface motive were 13 and 14, while his scores for surface strategy were 15 and 13. His scores for achieving motive remained constant at 14, while scores for achieving strategy changed from 21 to 22. The most notable change was in the areas of deep motive and deep strategy, with scores of 20 and 24 for deep motive, and 16 and 23 for deep strategy. There is some incongruence, particularly between achieving motives and achieving strategies, which is consistent from pre- to post-intervention. This may have led to some frustration for Stewart in his daily work, resulting in little change of any significance in his strategic behaviour during the intervention, as he may be using achieving strategies, but obtains little satisfaction as he displays relatively low achieving motives. Changes in motives for learning for Stewart are presented in Figure 8. Results for changes in strategies for learning are presented in Figure 9.

In the following excerpt, Stewart's behaviour is described during an observation session early in the intervention. During the entire forty-minute S.T.A.R. session, when students were to begin editing a story they had written, he laughed, giggled, and distracted other students. He did not complete any work during the session. First, he had to return to his classroom for supplies, following which he changed desks three times and wandered around the classroom. He refused any offers of help from the teacher or the investigator and would not cooperate in the required activity.

Similarly, during a second observation session occurring midway through intervention, it became apparent that Stewart was easily distracted, and immediately began interrupting those students around him to ask what he was

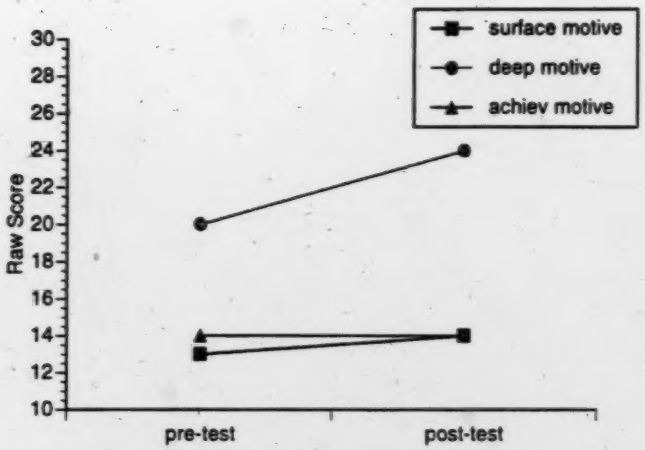


Fig. 8 Changes in motives for learning (Stewart)

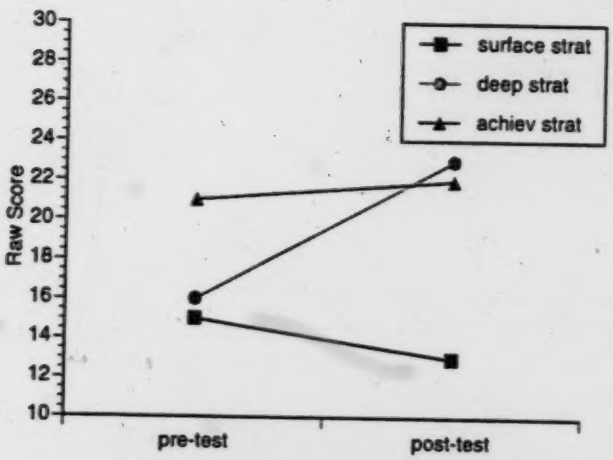


Fig. 9 Changes in strategies for learning (Stewart)

supposed to be doing. He tended to quickly become dependent on a helper (either another student or the investigator and teacher). On several occasions during this session, merely the physical proximity of the teacher was enough to create dependence in Stewart's behaviour.

During a final observation session with Stewart, he was to be editing a story, using the COPS strategy, on the computer. He was spoken to several times by the S.T.A.R. teacher for talking and not working, and finally was asked to leave the computer and return to his desk.

Although progress was not particularly notable during the observation sessions described in this study, the year-end progress report for Stewart indicated that he was showing improvement in organizational skills. His effort was satisfactory. The teacher noted that he still needed assistance to read grade level material and discuss what had been read. He was now more able, however, to discuss and make revisions to his writing, and could develop logical reasoning to support and explain his personal point of view. This had not been the case prior to intervention, as noted by the teacher. These positive changes might indicate that, although changes were not forthcoming during S.T.A.R. sessions when he was being observed, Stewart may have at least begun to transfer some of the skills to other other activities in the regular classroom. Results on the HLATs in writing indicated 'achievement at grade level' with 'limited proficiency.'

A second student, Daryl, also did not appear to benefit as much as should have been expected from the intervention. Daryl was eleven years and in grade six. His score on the vocabulary subtest of the WISC-III was 9, and he scored 76 percent on the competing list of the SAAT. His score on the CTRS-39 was 57, and his grade equivalent scores on the reading comprehension subtest

of the CAT were 4.5, corresponding to a scaled score of 507, for both pre- and post-intervention. Pre- and post-intervention scores on the MRAQ were 53 and 60. Daryl's scores on the LPQ indicate an increase in the use of a surface motive and surface strategy approach to learning, with scores of 10 and 13 for surface motive, and scores of 8 and 12 for surface strategy from pre- to post-intervention. Scores for deep motive were 24 and 23, while scores for deep strategy were 20 and 17. Again, these scores indicate a level of incongruence between Daryl's motives in his work and the strategy approach he uses. Scores for achieving motive were 17 and 18., while achieving strategy scores were 21 and 17 from pre- to post-intervention. Changes in motives for learning results are presented in Figure 10. Results for changes in strategies for learning are presented in Figure 11.

During all three observation sessions with Daryl he accomplished very little. During the first session, he fooled around with supplies in his desk, did not listen to instructions from the S.T.A.R. teacher, and did not settle down to work at all. He kept moving his chair, making distracting noises, and when asked to move to a chair closer to the teacher and face her, he continued to look all around and fidget with his pen and paper. During a second session, occurring midway through intervention, Daryl didn't even arrive in the S.T.A.R. room until well into the forty-minute period. As well, he kept leaving the classroom for a variety of excuses. Finally, during the third observation session with Daryl, during which time he was instructed to edit a story he had written, he was able to give an idea of the story's direction, but demonstrated little knowledge of editing strategies. When asked specifically about the COPS strategy, he was unable to describe the steps in the strategy or what the letters stood for.

Results and comments on Daryl's progress report indicated that this

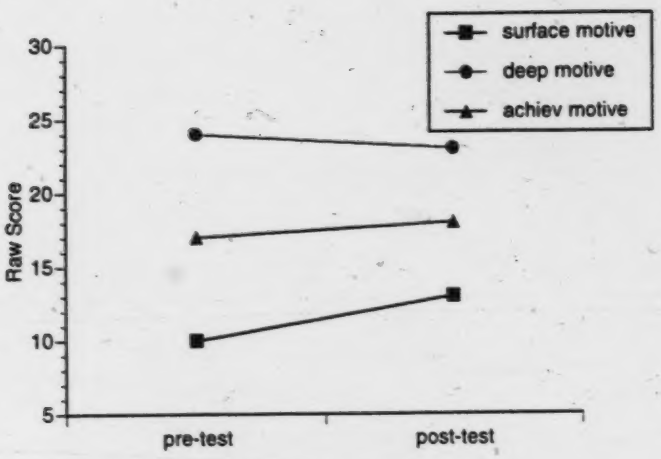


Fig.10 Changes in motives for learning (Daryl)

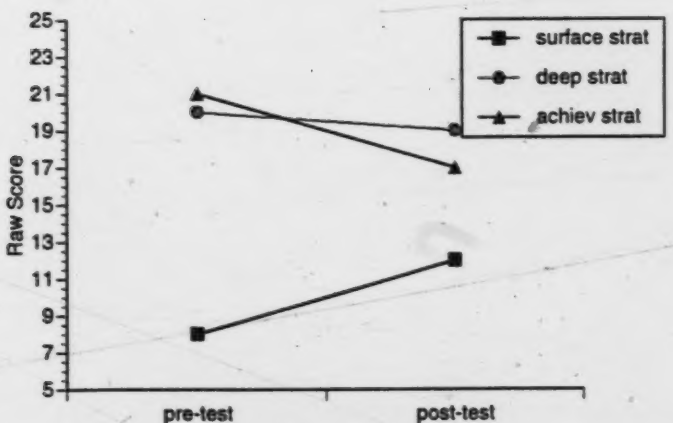


Fig. 11 Changes in strategies for learning (Daryl)

student's work does not meet acceptable level. He continues to require considerable teacher direction. He tends to rush through work. He needs assistance to read grade level material and to participate in discussion of what has been read. HLATs results indicate 'achievement at grade level' with 'limited proficiency.'

Although five of the students, three who were more successful in their attempts to incorporate the use of metacognitive and cognitive strategies in their learning, and two who were less able to do so, were selected for focus in this Think Aloud section of the paper, progress report and HLATs in writing data were collected for all nine students who participated in the study. The following excerpts for the remaining four students from end of year student progress reports and results on the HLATs writing assessments document teachers' perceptions of the changes demonstrated by these students.

"This student's work is meeting acceptable level. He is able now to work more independently and is showing improvement in beginning work promptly and remaining on task. He has shown significant improvement in listening attentively and remaining focused. He requires extra time to process information or to formulate responses and complete class assignments. Results of the HLATs in writing indicate 'achievement at grade level' with 'limited proficiency.'"

"This student's work meets acceptable level. He has improved in personal organization. He sets high standards for himself. Achievement on the HLATs in writing indicate 'achievement at grade level' with 'adequate proficiency.'"

"This student is experiencing difficulty with grade level expectations. He has a positive attitude, however, and enjoys his time in class. He has shown

considerable growth in his ability to ignore distractions and focus on completing assignments. He is now able to work independently and is showing improvement in beginning work promptly and remaining on task. Results on the HLATs in writing indicate 'achievement at grade level' with 'limited proficiency.'"

"This student's work in language arts is meeting the acceptable level. He is now more aware of the importance of rereading for meaning. Results on the HLATs in writing indicate 'achievement at grade level' with 'adequate proficiency.'"

The excerpts from the observation sessions described here are very typical of the types of sessions conducted with all students participating in the study. The students became increasing able to regulate their own learning and interaction with strategies and content material. For example, one of the students described earlier in this section, John, during a language arts class in late May, was able to write a complete letter, edit it using the COPS strategy, do his revisions, and complete a good copy of the letter, within the 30-minute time frame given for this assignment, without any prompting from either the teacher or the investigator. The topic was writing a persuasive letter in preparation for the completion of the year-end HLAT writing task. Prior to beginning to write, the student chose the topic (Education Cuts) without any direction, and began immediately to construct a mind map for the letter prior to writing the rough draft.

All students in the school, including those directly participating in the study, became increasingly involved in goal-setting and meeting of goals. The students were asked to reflect on the goals they had achieved, goals that were on-going, and those that were not achieved. They were asked to reflect on subsequent accomplishments and determine growth areas for the next academic year. The participation of the students in this process was focused

and thorough, with each student in the study able to complete this reflection.

Additionally, on all student progress reports, as a result of the S.T.A.R. program implementation, a new section was added to the student progress report. This section reported directly on strategies covered in the S.T.A.R. program, as well as student progress in the use of strategies and the effort and beliefs demonstrated by the student in the importance of strategy use. A typical entry under the "Skills for Thinking and Research" section at the mid-point in the study was as follows: "(Student) has been learning strategies to help him gain confidence as an independent thinker and learner. He understands that good listening means responding to a signal. He has practised library skills including locating books using the catalogue. Research skills have emphasized planning and organization as key elements to effective project work. He has practised note-taking, recording information in his own words. These skills are being used in writing a report that is linked to the core program." Similarly, a typical entry at the end of the study in June of the academic year was as follows: "(Student) has made satisfactory progress in understanding and using the research process taught in S.T.A.R. class. He showed progress in learning to manage a project within time limitations and achieve a finished product. He has gained valuable experience in gathering materials from a variety of sources and in being able to select appropriate facts for the task at hand. He showed growth in his ability to keep papers organized over many weeks and demonstrated increased confidence in independent working skills."

The addition of this new section to student progress reports in the participating school is a significant development, as it highlights the interrelationship between assessment and instruction. In this case the assessment is driving the instruction, and ultimately, this is the ideal context for

cognitive and metacognitive strategy instruction, as well as the retraining of attributional beliefs. The addition of this section is also a very significant indicator of both the success of the program, and the feasibility of implementing such a program, as the principal and teachers felt the program was of enough importance to merit a separate section in the progress report, rather than including such comments and qualitative evaluation of students' work and achievement in the use of strategies under the various content area headings. Additionally, of equal importance is the observation by the teachers and the investigator that the reporting of student progress and achievement directly, with respect to the use of cognitive and metacognitive strategies, generated questions and stimulated interest on the part of parents of students in the school. It is, as a result of such questions and interest on behalf of the parents, realistic to expect that further growth, especially in the nature of home-school partnership in facilitating student growth and achievements, would be enhanced.

The classroom observation procedures followed in this study, while at times 'unwieldy,' did provide a more natural context in which to assess student's thought processes and behaviour while engaged in academic tasks using the strategies they had been taught. Additionally, the setting served to demonstrate how strategic behaviours can be successfully studied in real classrooms to determine individual differences in learning, which then provides direction for ways to develop methods to as accurately as possible assess metacognition and self-regulation in students. Evidence is also provided in the Think Aloud protocols that strategy use also affects students' attributions and feelings of self-efficacy.

Results of Attribution Training

The students, as they began to perceive their successes, began to attribute such success and achievement to effort in the use of the strategies they had been taught. This was observed in their behavior as they arrived for the S.T.A.R. program sessions. Whereas prior to intervention, the students with attentional problems would waste a considerable amount of time wandering around, either disrupting other students, or because they weren't sure how to proceed with an assigned task, as the intervention progressed they were more efficient in retrieving materials they needed to work on their assignments once they entered the room, and settled more quickly to their work. This resulted in a greater level of on-task behaviour on the part of these students. Students participating in the study, as observed by the teacher and the investigator, also required less redirection.

As stated by Marsh, Cairns, Relich, Barnes and Debus (1984) procedures for measuring attribution have not been adequately developed or refined. In the present study, it can be inferred, however, through the subjective measures of students statements as well as behavioral evidence, that students were making effort-related attributions for their success. These attributions, in combination with the use of the cognitive and metacognitive strategies, served to enhance self-regulatory behaviour.

One of the more interesting, and initially unexpected outcomes, due to the short time frame for the study, was that a common language, in terms of strategy names and terminology began to be shared throughout the school. This was initiated, unsolicited, by the students themselves, and quickly embraced by the teachers and administrator. This was an important development. As Costa and Marzano (1987) state, the development of a shared

language within the classroom, and in this case, the whole school, is a critical factor in promoting the development of metacognitive and cognitive learning and thinking, as well as instructional strategies. It is through this shared language, and the meaning of that language, that a structure of perceptions and beliefs about the knowledge held by students, teachers, and administrators within the classrooms and the school as a whole is created. Students and teachers are better able to communicate about the function and nature of their knowledge and are, as a result, better able to use this knowledge to solve problems, evaluate information, and generate new knowledge. Additionally, it is this shared language which enables teachers to become increasingly effective mediators with respect to the learning and thinking occurring within the classrooms, as well as the attributions and beliefs students (and teachers) hold about the reasons for success and failure, and the importance of effort in learning.

The previous two sections have presented the results obtained from the assessment of students' application of metacognitive and cognitive strategies, classroom teachers' comments on student progress reports, HLATs in writing achievement results, as well as results with respect to the attribution training component of the intervention. Excerpts from classroom observations served to illustrate how students used the Think Aloud procedure to guide their use of strategies in reading comprehension and creative writing. Five of the nine students who participated in the study were chosen for more in-depth focus. Three students selected were more successful in their use of strategies demonstrating the ability to become increasingly able to successfully use the strategies that had been taught to work more independently. On the other hand, two students from the group did not appear to be as successful,

continuing, throughout the intervention to require a significant amount of direction. They appeared very distractible during observation sessions, and had difficulty remaining on-task long enough to use the Think Aloud procedure to facilitate the use of the strategies.

Classroom teachers' comments on student progress reports indicated that all the students in the study had improved in their ability to work independently. Additionally, teachers noted a more positive attitude on the part of these students, as well as more responsibility for their learning.

Post-Intervention Interview with the School Principal

An interview with the school principal, held at the conclusion of the intervention, in June of the academic year, yielded several interesting perceptions, both positive and negative, regarding the evolution of the S.T.A.R. program. A series of questions was proposed for reflection and yielded the following responses:

"How and why did the S.T.A.R. program come into existence at this school?"

In addition to the description of the S.T.A.R. program previously presented, the principal indicated that initially, it was recognized that the focus needed to continue to be on the learning that was already taking place in the classroom. He stressed that the purpose of the S.T.A.R. program was not to create a curriculum. He also stated that it was important to make the program valuable, and that individual teacher needs were acknowledged and responded to quickly. This meant that the S.T.A.R. networked with classroom teachers to be able to relate what was happening in strategy instruction to the content being taught in the regular classroom. It was also recognized that it was important to

keep the program high profile, with significant program sharing avenues explored, both indirect and direct. Initially this high profile status was attempted through weekly staff memoranda, however this was negatively received by many staff members who perceived this process as "show boating." The move was then made to sharing both in staff meetings and through numerous information opportunities to demonstrate to staff members the value of the program. This was done through personal teacher illustrations, sharing of individual successes by teachers, and through student demonstration of work. In short, every opportunity was utilized to promote the S.T.A.R. objectives and development. Success was more evident during the second year of the program, first of all, because as the classroom teachers were more directly involved in the teaching and reinforcing of the strategies, they felt increasing ownership of the program and were able to be more directly supportive of students' efforts in the regular classroom.

"What did/do you see as your role as principal in the development and maintaining of the S.T.A.R. program?"

The role of the principal, from his own perspective, was to facilitate, support and encourage teachers in this new direction for working with their students. The principal felt that both teachers and students were now becoming more active in their learning, increasingly embracing a constructivist approach to learning.

"Were there key elements that enabled the program to be successful?"

One of the factors ensuring the success of the program was the S.T.A.R. teacher's skill in being able to map out where the program was going during

that first year. Also enabling was that particular teacher's ability to relate skill development within the S.T.A.R. program with the curriculum. An additional reason that the program was so successful, from the perception of the principal, based on feedback from staff members and in his personal opinion, was the behind the scenes work of the coordinating S.T.A.R. teacher whose flexibility in approach accommodated individual teacher needs and perceptions. As teachers saw the value and success of the program they were able to effectively incorporate elements of the program in their daily classroom instruction. At times, in the principal's opinion, the excitement of the teachers was significant.

"What, if any, were your observations as the program was developed and implemented?"

On the positive side, shortly after the program was initiated, one of the first noticeable developments, as noted previously, was that the students and teachers began to develop a common vocabulary. This was one of the first indications that something valuable was taking place in all the classrooms.

The principal's perceptions supported the investigator's observations, in that there was growth in the students. They had developed the ability to apply a strategy, and bring their ideas and assignments through to completion. It was also the principal's perception that there was increased student efficiency in working independently and that students had developed a belief in the value of the strategies. A significant development, from the principal's observations, was that students were able to provide a "paper trail" of their work, as well as being able to articulately share this paper trail with teachers, parents, and their peers. The "paper trail" of which he spoke is the same one as was described earlier in this section. Examples of "paper trails" are provided, as well, in Appendix K.

On perhaps a less positive note, at least at the beginning of year one of the program implementation, the various teachers in the school differed significantly in the amount of involvement they had in the program during the first year of implementation. A follow-up interview at the end of year two of implementation, however, indicated that the levels of input from all teachers were more consistent. Those who hadn't "bought in" during the first year were beginning to do so by year two and in fact, according to the principal, most had bought in completely by the end of year two. The principal cited one example of a reluctant teacher during the initial implementation who finally brought S.T.A.R. into the classroom and ended up in being closest, in terms of objectives, to the program goals.

It must be noted also, that there were, indeed, some problems encountered during the first year of the program. The first problem had to do with the amount of time spent on strategy instruction. Students expressed frustration with only forty minutes of S.T.A.R. each week. These students were not feeling satisfied that they had the time to learn and apply what they were being taught during S.T.A.R. sessions. Additionally, there was not enough time for the teacher to directly instruct students in the use of strategies, nor did the students nor the teachers feel the forty minutes gave them enough time to practise the strategies and have their questions answered to enable them to take their new strategies back to their regular classrooms and use them effectively.

Also, despite the principal's belief that the program was an incredible concept, there were teachers on the staff who held the feeling that it was the "S.T.A.R. teacher's" program. Addressing the students' frustrations and the staff dynamics became an important issue.

"How were these problems addressed?"

The principal indicated that one of the solutions implemented to specifically address the two concerns about lack of time available was the addition of twenty minutes per week to the S.T.A.R. schedule at the grades one, two, five and six levels. The additional time was not allotted to grades three and four due to cost and scheduling problems. This added time was designed to allow for the classroom teachers to be in the S.T.A.R. session with their own classes to engage with the students and see them in action. It was felt that this would provide additional insight for the classroom teacher into the program itself, as well as facilitate a collaborative teaming with the S.T.A.R. teacher.

Another issue, according to the principal, that is currently being addressed is the perception, by some students, that S.T.A.R. is separate from regular learning. To enable students to increasingly make the connection between what was happening in the S.T.A.R. "room" and the regular classroom, the S.T.A.R. program was moved from its own classroom into the open library setting. Additionally, a significant portion of the strategy instruction and support was carried out in the students' regular classrooms, using a team teaching approach by the S.T.A.R. teacher and the classroom teacher.

"What sort of feedback have teachers provided with regard to the success of the S.T.A.R. program?"

Feedback from the principal and the teachers at the school, indicated that with the expansion of Alberta Education achievement testing at the grades three and six levels, there was a need to address effective ways for students to succeed on these assessment instruments. Both the principal and the teachers

feel that the S.T.A.R. program has worked. Students whose teachers expected them to not do well on the tests indeed succeeded on the year-end achievement tests at these grade levels and met grade level expectations. The principal felt that the teachers had accepted the responsibility for strategies instruction and felt gratified to see their work pay off in terms of unanticipated levels of student achievement. Although it can't be conclusively stated, due to the nature of this study, whether this was due to the S.T.A.R. program with its focus on cognitive and metacognitive strategies, in combination with attribution training, teachers, both those directly involved in this study as well as other teachers in the school, however, certainly felt this was indeed the situation.

Post-Intervention Interview with the S.T.A.R. Teacher

At the end of the intervention period, in late May, an interview with the teacher directly responsible for the S.T.A.R. program and the teaching of cognitive and metacognitive strategies to all the students in the school yielded equally positive thoughts about the success of the program. This teacher was extremely excited about the progress she had made in the first year with the students. As well, she was very positive in her perceptions as to the feasibility of implementing such a program within the context of a whole school approach to cognitive and metacognitive strategies instruction. The following questions were directed to this teacher:

"How do you feel about the way the program has developed in year one?"

This teacher felt she had maintained her focus on learning how to think "better" and the acquisition by students of skills and strategies to facilitate this process. The teacher also strongly believed that transfer skills were

considered to be critical, and she felt she ensured that students were continually provided with opportunities to practise the process of transfer. She believed that students were encouraged, through the kinds of feedback she provided, to always maintain strategy use. One of the phrases this teacher used that guided her teaching was "bring their thinking into their consciousness." She encouraged the students to "Show what I know and can do in all situations."

"How did you go about interacting with the students in the S.T.A.R. program?"

The teacher indicated that, in her dialogue with students, she used questions to generate discussion about the use of specific strategies. One example of such questions to stimulate dialogue is as follows:
Teacher: "How is this different from the way we used the strategy the other day? We checked for meaning or understanding, vocabulary, and ideas expressed in good sense (in the revisions to a story). Today we are doing editing using COPS and we are going to transfer this strategy from here in the S.T.A.R. room to your classroom. We are going to draw names to determine editing partners when you go back to your classroom, so you can use what you have practised here."

Interviews Summary

From the position of this investigator, there is little question that the enthusiasm and energy by the S.T.A.R. teacher aided in the overall success of the program. This teacher, as she began to see individual student success, became even more excited in the process, and as her confidence in the students' abilities to access and use strategies to become more independent learners increased, so did her own confidence as a 'teacher of thinking.'

In summary, the interviews with the principal and the teacher of the S.T.A.R. program addresses the issue of feasibility of implementing, successfully, a cognitive and metacognitive strategies approach to student learning. Both the principal and the teacher of the S.T.A.R. program identified several important components to the success of the intervention. First of all, communication between the S.T.A.R. teacher and regular classroom teachers was important. Both students and teachers became more active participants in the learning process. Relating skill development with respect to the teaching of the strategies during S.T.A.R. sessions to learning carried out in the regular classroom was also important. Key to this was the flexibility of the S.T.A.R. teaching in accommodating classroom teachers' needs and perceptions. Both the principal and S.T.A.R. teacher felt that students became more able to apply strategies, were now more independent in their learning, and began to believe in the utility of strategy use.

A decision taken at the end of the first year of implementation also addresses the issue of feasibility of implementation. During the intervention period, the first year of the S.T.A.R. program, it was realized that not enough time was being allotted for both the direct instruction of strategies and for students to practise using the strategies. Additionally, more effort was needed to integrate the instruction in the S.T.A.R. classroom with the regular classroom, to recognize the importance of the transfer and generalization of strategies. Both of these concerns were addressed through increasing the length of S.T.A.R. class time from forty minutes to one hour per classroom per week. This allowed not only the extra time to work with students on their strategy practice, but also allowed the classroom teachers to spend time in the S.T.A.R. classroom with their students, working with the S.T.A.R. teacher on issues such as

consistency of strategy instruction and integration into regular classroom instruction.

There is little question that the enthusiasm and excitement of the S.T.A.R. teacher and the classroom teachers was a significant element of program success. As well, it was noted during the intervention period, that teachers' confidence in the implementation of metacognitive and cognitive strategy instruction grew significantly.

Chapter Summary

Students in the study were identified as demonstrating attentional problems at a level that indicated concern with respect to their learning, on the basis of the CTRS-39, the Stroop Color and Word Test, and the SAAT.

Significant change was found in students' metacognitive awareness from pre- to post-intervention. Additionally, with respect to reading comprehension, a significant increase in achievement level results over the course of intervention implementation was noted.

Use of the Think Aloud procedure served to document students' use of strategies in the language arts content area. Although only five of the nine students were profiled for in-depth examination, the majority of the students appeared to become more proficient in the use of strategies, and were able to use strategies with less teacher prompting, thus becoming more independent in their learning. Transfer and generalization was demonstrated by the students.

Teachers' comments on student progress reports supported the finding from the MRAQ and Reading Comprehension subtest of the CAT. The majority of students were reported to be more successful in their academic tasks, and were perceived by the teachers to be more responsible and independent in

their learning.

The comments and perceptions of the principal and S.T.A.R. teacher reinforced the belief in the utility of the metacognitive and cognitive strategy intervention implementation. Communication between teachers, as well as flexibility in incorporating strategy instruction into the regular classrooms was found to be an integral component of the program's success. It was noted that it was also important to devote adequate time both to the direct instruction of strategies, and opportunity for the practice in the use of strategies by the students. The development of a common language between teachers and students throughout the school was considered significant. Finally, the enthusiasm of the teachers was essential for facilitating students' use of strategies, for the recognition of the importance of a belief in the utility of strategy use by the students, and for the overall success of the program in the school.

CHAPTER FIVE

CONCLUSIONS AND FUTURE DIRECTIONS

The purpose of the present study was to examine the effects of metacognitive and cognitive strategy instruction on the learning and achievement, as well as the attributions, of students displaying attentional problems. Nine grade five and six boys were identified through teacher nomination and subsequent standardized measures of inattention as displaying attentional difficulties to the extent that learning was inhibited.

Several instruments were administered both prior to and following intervention to allow documentation of changes in achievement and performance levels as well as changes in attribution on the part of the subjects. The Strategies Program for Effective Learning/Thinking (SPELT) was chosen as the strategy training component of the intervention, based on the belief that intervention is most effective when it is carried out the context of the regular learning environment, as SPELT is designed to do. Students received direct instruction and practice with feedback in the use of several cognitive and metacognitive strategies through the intervention. The attributional component of the intervention was designed to enhance students' belief in the importance of effort in ensuring success on academic tasks. Feedback regarding the importance of effort was provided by the teachers and the investigator on a continuous basis through questioning and prompting effort-attribution

statements. The language arts content area, including both reading and writing, was chosen as the focus area for the study because it is one of the most important academic areas necessary for school success.

The results appear very promising, with respect to the effectiveness of strategy instruction in making students more aware of strategies and attributional beliefs regarding the utility of strategy use, in that a number of positive changes occurred. There was a significant increase on the Metacognitive Reading Awareness Questionnaire in students' metacognitive reading awareness. This is an important change, demonstrating that students appeared to become more aware of strategies they were using, and continued to be more aware of the strategies throughout the intervention. Similarly, there was a significant increase in students' reading comprehension achievement scores on the Canadian Achievement Test. The combination of significant increases on the MRAQ and the CAT is important as it may indicate that not only were students more aware of the reading strategies, they may have been more able to use this awareness to increase their reading comprehension abilities.

There were no other significant changes on any of the remainder of the pre- and post-assessment instruments. It had been anticipated that students would, indeed, demonstrate significant change, and the fact that changes did not occur is somewhat surprising, however this may be due to a number of factors. For example, on the Learning Process Questionnaire, which is designed to describe students' approaches and orientations to learning, it may be that since an in-depth understanding of how one learns, and the attitudes one holds toward one's learning are relatively stable characteristics, it may take longer than the time allotted in this study to change overall processes of students' understanding of, and approaches to, their own learning.

It must be noted, however, that despite the lack of significant change on the Learning Process Questionnaire for the group of students participating in the study, individual students did demonstrate change in their use of motives and strategy approaches to learning. Of the five students who were profiled in depth, the three who demonstrated such positive changes, although indicating the use of 'deep' motives and strategies to begin with, relied, over the course of the intervention, even less on surface approaches to their learning and more on deep motives and approaches. This may help to explain why, in fact, these students were more successful in the utilization of the strategies they had been taught to increasingly self-regulate their learning.

Similarly, in order for significant changes to occur on the Self-Perception For Children and A Scale of Intrinsic Versus Extrinsic Orientation in the Classroom, it may be the case that students may need extensive encounters with working with strategies and reshaping attributions before their self-perceptions and orientations with respect to motivation, which are again, stable dimensions over time, are positively affected, and reflected in how students view themselves.

Observations conducted in the classrooms provided insight into students' use of the cognitive and metacognitive strategies that had been taught, as well as their use of the Think Aloud procedure as a strategy to guide their actual use of the strategies. Three of the nine students demonstrated, through the verbalizations of their thought processes, an increased ability to self-regulate their use of the strategies in their reading for information purpose tasks, as well as in their creative or research writing tasks. One of the factors in the success of the students may have the use of the 'think aloud' procedure as a strategy in and of itself. Although Hamlett et al (1987) found that students with attention

deficits were less able than those without such deficits to communicate the strategies they were using, in the present study, the use of the Think Aloud strategy may have helped to alleviate this difficulty. The students were enabled, therefore, by being able to communicate what they were doing, to achieve more success in the use of strategies.

Interviews with the teacher of the S.T.A.R. program and the principal of the participating school indicated that their perceptions of the success of the program were very encouraging. Factors critical to the success of the program were identified as the S.T.A.R. teacher's flexibility in accommodating individual student and classroom teacher needs, as well as the ability to relate skill development within the program of cognitive and metacognitive strategies instruction to the curriculum. Both the principal and teachers indicated that they had observed growth in students' ability to apply strategies, as well as increased student efficiency in working independently. Additionally, the principal and teachers felt that students had developed a belief in the utility of strategy use. The results obtained with respect to students' changes and teacher perceptions indicated that it is feasible to incorporate the teaching of metacognitive and cognitive strategies for learning/thinking within a whole school context. Indeed the decision to increase the amount of instructional time devoted to the teaching of strategies within the S.T.A.R. program, as well as the move to integrate, more closely, the program with the learning and teaching carried out in the regular classroom is very encouraging.

Although teachers, at the beginning of the program, differed in the amount of involvement and enthusiasm they showed, by the end of the intervention implementation for the present study, teachers were more consistent in their implementation of strategies instruction in the classroom, and

indeed were very enthusiastic about the program. A result of this was that, as the enthusiasm of the teachers grew, it was difficult to control for the Hawthorne effect. It should be noted, however, that teacher enthusiasm is valuable, and even essential, for the ultimate success of any such program implemented in a school setting.

Limitations

While the results presented demonstrate the success students achieved in the use of cognitive and metacognitive strategies for reading and writing in language arts, as well as illustrate the feasibility of implementing such a program within a whole-school context, several important limitations should be addressed. First of all, it is very difficult to measure strategy competence, yet there is a need to be able to show student increase in knowledge acquisition and increased proficiency in use of strategies for students engaged in strategy instruction

An second limitation involves the data collection process in that the actual amount of time students were given in the regular classroom to practise the strategies they had been taught needs to be monitored. As well, analysis of teachers' statements to, and interactions with, students about process and content, as well as teachers' responses to students' statements about strategy use is essential information. This could have been carried out through video-taping of the students and teachers throughout the school day, as well as through the use of teacher journals. In the present study, teacher journals were not completed as initially anticipated . In order to focus on the teaching of metacognitive and cognitive strategies, in addition to all the other demands placed on teachers during the normal course of the school day, it was

felt that this was too much to handle.

Another limitation has to do with the data with respect to students' attributional beliefs. First of all, there needs to be a more valid way to measure the number and types of attributional feedback statements used by teachers to reinforce students' use of strategies and the importance of effort-related behaviours. Secondly, more emphasis must be placed on finding out, on a more continuous and consistent basis, the kinds of attributions students hold throughout an intervention program such as was implemented in the present study.

There is also a further need to refine the data collection process, particularly with respect to students' use of the concurrent verbalization Think Aloud procedure. The use of video or audio taping would permit more frequent recording of students' use of this procedure to guide their use of strategies and may help to alleviate the problem of recording what all the participants were doing, both during S.T.A.R. sessions, and, as well, in the regular classroom. In conjunction with this, there is a need to further refine techniques used to capture the development of learning/thinking strategies and the transfer and generalization of the strategies.

Finally, with respect to the present study, teacher fidelity to instruction needs to be documented to enable to assess the impact of differential implementation, with respect to the degree of implementation as well as the quality of such implementation. Teacher explanation of the strategy also needs to be documented. Questions such as do teachers use similar instruction behaviours, how do teachers encourage students to continue to use strategies, as well as the issues of collegiality among the teaching staff, support from administration, and, ultimately, partnership with parents must be addressed.

This would address the issue of the differential success experienced by students in this study, in that some teachers may not have been as supportive as others, especially in terms of the generalization and transfer of strategies to the regular classroom. Another issue in terms of teachers' strategy instruction and feedback to students may be the match between teacher and student.

With respect to the design of the study, a limitation of the present study was a lack of clear controls. The replication of this study using both experimental and control classrooms would allow a comparison of students who received cognitive and metacognitive strategy and attribution training with students who received traditional instruction within the context of the regular classroom.

Despite the limitations of this study, it is clear there is a need to continue metacognitive and cognitive strategy instruction in classrooms, particularly within a whole school context. There is clearly a need for such instruction to begin early in the elementary school years and for such instruction to be fully integrated within content areas.

Implications for Further Research and Educational Applications

This study attempted to examine, in some detail, individual differences with respect to student response to instruction. More work is needed to examine subgroups of students with attentional problems in an attempt to better understand why some students are able to benefit from the intervention more than are others. A specific focus on these subgroups of students will provide greater insight into enhancing the efficacy of a cognitive and metacognitive strategies program with these students. With respect to the present study, in questioning why did the intervention work better for some students than for

others, this needs to be examined in more detail through further research. Some of the students may have, to a greater extent, lacked a systematic strategic approach to tasks, and thus were able to benefit more quickly when provided with the strategies that allowed them to become more systematic.

For students who appeared less able to benefit efficaciously from the short time frame of the intervention, it may be that more intensive instruction carried out within a small group instructional context, may have resulted in more pervasive change in their use of strategies. Additionally, it may be that these students may take a longer period of time to begin to be able to systematically apply the strategies to self-regulate their learning. Especially for these students, explicit training is especially important because it has been found to produce significant improvement in both strategies behaviour and metacognitive awareness (Ghatala, Levin, Pressley, & Goodwin, 1986).

Additionally, with respect to the varying degrees of change, and ultimate success, demonstrated by the nine students, it may also be the case that the severity of the behaviour was an influencing factor. It would appear from the data from this present study, that students with more severe attentional problems benefited less from the intervention within the time frame of this study.

A more intense focus on motivational and attributional components, than was carried out in the present study, may be needed to promote attributions that are effort-related for these students. These statements must be explicit and embedded within the strategy-based instruction. It also must be pointed out to these students that there are realistic limits placed on their achievement, despite positive attributions, due to task difficulty and task demands.

Further research must be carried out to determine other variables that may affect successful implementation of a strategies program. Components

which may determine the ultimate success of such a program include classroom management, student ability diversity, and assessment of strategy use by students, as the assessment of such strategies does not fit with traditional assessment tools currently in use by school personnel.

With respect to the successful teaching of cognitive and metacognitive strategies approach in the regular classroom, there is a need to embrace a broader view of teaching, one which increasingly focuses on the equal contributions of attribution and motivation training with the teaching of the strategies themselves. Following from this is the need to research the long term maintenance of the strategies taught in elementary school into junior high and beyond. The issue regarding how teachers will be able to manage the demands placed on them by cognitive strategy instruction must be addressed as well, with further research addressing the need to develop integrated forms of instruction.

A final implication of the implementation of cognitive and metacognitive strategy instruction within a whole-school context is the issue of initial program success in terms of student growth. When achievement gains are not quickly forthcoming, and expected growth is not immediately demonstrated, it will be essential to be able to demonstrate the importance of continuing such a program in order to convince both teachers and the school's administration to continue support for the program.

Given the current state of educational change, educators will play an increasing role within the context of the inclusive classroom in responding to the learning needs of all children, including those with attentional difficulties. This will be carried out within the constraints of fewer resources and resource personnel available to provide assistance. Teachers will need a broad based

understanding of both contributing factors to effective intervention with students, as well as a variety of intervention approaches, to enable them to successfully meet the learning needs of all students.

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Appendix A

Teacher Participation Letter

Dear Teacher,

I am conducting a research study within the public schools in the Edmonton area, the purpose of which is to investigate the influence and effect of metacognitive strategies training in combination with attribution and motivation training on the use, maintenance, and transfer of strategic behaviours by children who display problems with attention, impulsivity and overactivity in the classroom

The research project is titled "Metacognitive Strategies Training: The Strategies Program for Effective Learning/Thinking (SPELT)." I am looking for grade five teachers who are interested in participating in this research project, as well as boys in their classes who display problems with attention, impulsivity and overactivity.

If you agree to participate in this study, the demands on your time will consist of the following:

1. You will be asked to identify those boys in your class who meet the specific criteria outlined for you.
2. After identification of these students, you will send home information letters and consent forms describing the study. The consent forms will be returned to you, and I will contact you about the results.
3. You will be asked to complete the Conners Teaching Rating Scale for the students who obtain consent to participate in the study. If the students you have identified meet the criteria set out in the research proposal, you will be asked to continue your participation in the study. If the students do not meet the specific criteria, your participation in the study will end at this point in the project.
4. You will be asked to complete a Student Information Form which requires you to summarize the most recent educational assessment results in the student's school file. (I will obtain parental consent for the release of this information.)
5. Once the students are identified, teachers will be randomly assigned to one of two experimental groups. The first groups of teachers will receive training in the implementation of the SPELT program, which they will, in turn, implement with all the students in their classroom. The second group of teachers will instruct their students using traditional instructional methods. Teachers in the traditional instruction group will be given the option to receive training in the implementation of SPELT at the

completion of the research study.

6. You will be asked to attend a two-day introductory workshop designed to facilitate the implementation of the SPELT program. Follow up workshops will be presented one month following this initial workshop, prior to intervention implementation, as well as one month following the beginning of the actual intervention period. Consultation and support will be provided by the researcher on an on-going basis throughout the intervention period which will be implemented during the four month period from January to April of the 1994 term.
7. You will be asked to keep a journal to record your thoughts, impressions and perceptions regarding the efficacy of metacognitive strategy instruction, and the involvement and progression of your students in strategy use. This journal will also contain documentation regarding actual strategies taught, and the dates and times allotted for both direct-teaching and practice of the specific strategies. You will be asked to monitor the involvement and progression of individual students on a regular basis through observation and information assessment.

The participation of the students involves the completion on an individual basis, under the supervision of the researcher, of a series of assessment instruments both prior to and following the intervention period. These instruments are designed to describe the student's perceptions of competency with academic tasks, the processes the student uses to engage in learning, as well as measures of cognitive impulsivity and general ability.

Students' participation also involves the active engagement in the learning of the strategies as presented by the teacher. Students participating in the study will also be asked to keep a journal or strategy log to record their own use of strategies as well as their attributions regarding the importance of strategy use.

All of the assessment information collected in this study becomes the property of the researcher. Individual results will be reported to you only if I receive a parental request to do so, accompanied with written permission to release the information. Upon the completion of this research, a summary of the group results of this project will be submitted to you.

If you have further questions, please contact me at 436-8949

Sincerely,

Sally Brenton-Haden, M.Ed.
Doctoral Candidate
University of Alberta

Appendix B

Teacher Consent Form

I consent to participate in a research study being conducted by Sally Brenton-Haden, titled "Metacognitive Strategies Training: The Strategies Program for Effective Learning/Thinking (SPELT)." I understand that my participation in this study will involve the following:

1. I will be asked to identify and nominate those boys in my class who may display ADHD characteristics and who meet the specific criteria outlined for me.

2. After identification of these students, I will send home information letters and consent forms describing the study. The consent forms will be returned to me, and I will be contacted by the researcher about the results of the forms.

3. I will be asked to complete the Conners Teacher Rating Scale for the students who obtain consent to participate in the study. I understand that if the students I nominate meet the criteria set out in the research project, my participation in the study will continue. I also understand that if the nominated students do not meet the specific criteria, my participation in the project will end at this point.

4. I will be asked to complete a Student Information Form which requires me to summarize the most recent education assessment results in the students' school file. (The researcher will obtain parental consent for the release of this information).

5. Once the students are identified, I will be randomly assigned to one of two treatment groups. If I am a strategies experimental group teacher I will receive training in the implementation of the SPELT program, which I will, in turn, implement with all the students in my classroom. If I am a traditional experimental group teacher, I will instruct my students using traditional instructional methods. I understand that if I am a teacher in the traditional instruction group I will be given the option to receive training in the implementation of SPELT at the completion of the research study.

6. I will be asked to attend a two-day introductory workshop designed to facilitate the implementation of the SPELT program. A follow-up workshop will be presented one month following this initial workshop, prior to intervention implementation. I understand that on-going consultation and support will be provided by the researcher throughout the intervention period which will be implemented during the months of January through April of the 1994 academic year.

7. I will be asked to keep a journal to record my thoughts, impressions and perceptions regarding the efficacy of metacognitive strategy instruction, and the involvement and progression of my students in strategy use. This journal will also contain documentation regarding actual strategies taught, and the dates and times allotted for both direct teaching and practice of the specific strategies. I will be asked to monitor the involvement and progression of individual students on a regular basis through observation and informal assessment.

I understand that all of the assessment information collected in this study becomes the property of the researcher. Individual results will not be reported to me unless the researcher receives a parental request to do so, accompanied with written permission to release the information I also understand that upon the completion of this research, a summary of the group results of this project will be forward to me.

_____ _____

Signature of Teacher Date

Appendix C

School Release of Information Form

I/We hereby give my/our consent for _____'s school to release information about _____'s educational history and most recent academic assessments to Sally Brenton-Haden. I/We understand that this information will be used solely for the purpose of describing group characteristics in Sally's doctoral dissertation titled: "Metacognitive Strategies Training: The Strategies Program for Effective Learning/Thinking (SPELT)."

_____

Signature(s) of Parent(s) or Guardian(s)

_____

Date

Appendix D

Student Consent Form

I agree to participate in a research project being conducted by Sally Brenton-Haden which involves my learning of strategies which will help me learn. I understand that if I agree to participate, my teacher will describe the way I learn my schoolwork. I understand that Sally is looking for students who learn a certain way, and that if i do not have these characteristics, I will not need to take part in this project. If I do learn using these characteristics I understand that I will participate in the study. I also understand that I will help Sally describe how I feel about the way i learn, and the processes that I use to learn new information.

I understand that I can end my participation in this project at any time. I also understand that the information I give Sally about me will not be shared with anyone at school unless my parents give Sally written permission to do so.

Signature of Child _____ Signature of Parent_____

Date_____

Appendix E

Parent Consent Form For Participation

I/We hereby give my/our consent for_____ to participate in a research project entitled "Metacognitive Strategies Training: The Strategies Program for Effective Learning/Thinking (SPELT)." I/We understand that this program is being implemented as part of the "Skills for Thinking and Research: (S.T.A.R.) program at our child's school. I/We understand that such consent means _____teacher will complete two rating scales describing his learning behaviour. I/We understand that if this rating does not meet criteria set out in the research project, that my/our child's participation in this study will end at this point. If the teacher's rating meets the study requirements I/we understand that _____ will participate in the study.

I/We understand that the results of the assessments will not be shared with the school without our written permission. I/We understand that I/we will receive information describing the group results of this research, and that we are to contact Sally Brenton-Haden if we wish to discuss our child's individual results with her. I/We understand that all questions I/we have about the study will be answered by Sally.

I/We also understand that our participation in this project may be terminated at any time at my/our request, our child's request, or at the request of the investigator (Sally). Participation in this project and/or withdrawal from this project will not affect the services my/our child receives from his school.

I/We understand that our child's involvement will consist of the completion, with Sally, of several forms used to describe our child's perception of his competence in academic learning, the processes he uses to learn, his motivation for learning, and his overall ability. I/We also understand that our child will be asked to keep a journal which records his feelings and thoughts regarding his learning. I/We understand that the information contained in the journal will not be linked to our child's name, and quotations from his journal will be reported anonymously in the final written project.

I/We understand that our child's classroom instruction process will be monitored through a series of classroom observation/participation sessions. I/We also understand that the classroom observation and participation sessions will be done by Sally and that the information will remain confidential. I/We understand that our child will not be identified in any way.

I/We also understand that my/our consent for participation also involved my/our permission for_____'s teacher to release selected results (achievement levels in specific subjects) to Sally. I/We understand that his teacher will obtain this information from my/our child's school file.

Signature of Parent(s)/Guardian(s)_____ Date_____

Appendix F

Learning Process Questionnaire

1. I want to take only those subjects in school that would help me get a job, not those that might be more interesting.

2. I find that at times my school work can give me a good feeling inside.

3. I try to obtain high marks in all my subjects because I like to beat the other kids.

4. I tend to study only what the teacher says, no more.

5. While I am learning things in school, I try to think of how useful they would be in real life.

6. I have a system for keeping my books, scribblers and other class things so that I can find them easily.

7. When I do poorly on a test, I worry about how I will do on the next one.

8. Although others may know better than I do, I feel I have to say what I think is right.

9. I really want to do better than everyone else in all of my schoolwork.

10. The best way for me to learn is to memorize things by heart.

11. In reading new stuff, I am often reminded of things I already know, and see them in a different way.

12. I try to plan my work all through the school y ear so that I get the best grades I can.

13. The only reason I can see for working hard in school is to get a good job when I leave school.

14. I find that many subjects can become very interesting once you get into them.

15. I like the results of tests to be put up in class so that the others can see how much I beat them by.

16. I prefer subjects in which I have to learn a lot of facts to ones in which I have to do a lot of reading and understanding.

17. I like to form my own ideas on a topic before I feel good about it.

18. I try to do all of my assignments as soon as they are given to me.

19. Even when I have studied hard for a test, I worry that I may not be able to do well on it.

20. I find that learning some topics can be really exciting.

21. I would rather do well in school than be popular with my class mates.

22. In most subjects I only work hard enough to make sure I pass.

23. I try to relate what I learn in one subject to other subjects.

24. I review soon after most lessons to make sure I understand what was taught.

25. I don't think that teachers should expect us to work on things that are not part of the school curriculum.

26. I feel that I might one day be able to change things in the world that I see now to be wrong.

27. I will work for top marks whether or not I like the subject.

28. I find it better to learn just the facts and details about something rather than try to figure it out myself.

29. I find that most new things taught in school are interesting and I may even spend extra time finding out more about them.

30. When a test is returned, I correct all the errors I made and try to see why I made them.

31. I only want to stay in school long enough to get a good job.

32. I believe that school is to help me to become my own person.

33. I see doing well in school as a sort of game, and I play to win.

34. I don't spend time on learning things that I know won't be on the tests.

35. I spend a lot of my free time finding out more about interesting things that have been talked about in class.

36. I try to read all the things the teacher says we should.

Appendix G

Metacognitive Reading Awareness Questionnaire - Interview Format

1. What do you like about reading? Why?
2. What, if anything, do you dislike about reading? Why?
3. Are there times when you think of yourself as a "good" reader? Explain.
4. Are there times when you think of yourself as a "poor" reader? Explain.
5. Please complete the following sentence: When I read, I try to..... .
6. What would help you become a better reader?
7. Do you think children your age read as well as adults? Why?
8. Suppose there were two boys names John and Alan who came from different homes. John's parents were rich and John had lots of toys and books. Alan's parents were poor and didn't have many books at home. Do you think one of these boys was a better reader at school? Which one? Why?
9. The other day I talked to a boy/girl who was really good at arithmetic. Do you think he/she was also a good reader? Why?
10. What makes someone a really good reader?
11. What does the first sentence usually do for a paragraph or story?
12. What does the last sentence do (for a story or a paragraph)?
13. I asked a boy named Mark to read a story that was five pages long, and a boy named Luke to read a story that was two pages long. Which boy took longer to read his story? Why?
14. If I asked you to read a story really fast and you could only read some sentences, which ones would you try to read? Why?
15. What makes something difficult to read?
16. When you're reading, what do you do if there's a word you don't understand.
17. What do you do if you don't understand a whole sentence?
18. When you read a story, how can you know you're reading it well?
19. When you're reading, do you ever make up pictures in your head? Why?
20. Do you ever have to go back and read things over? Why?

Appendix H

Metacognitive Reading Awareness Questionnaire - Interview Format Scoring Scale

No.	Code	Score	Scheme	Example
1.	like	0	lack of interest	don't like reading, boring
		1	passive, negative	so don't have to do chores
		2	passive, positive	good way to pass time
		3	active, affect only	fun, interesting, exciting
		4	active, affect+knowledge	fun, know more about world
2.	dislike	0	lack of interest	boring, hate reading
		1	reading as decoding	reading aloud, big words
		2	feeling, affect only	scary stories, science
		3	high interest	enjoy reading most time
		4	reading as comprehension	poorly written stories
3.	self good reader	0	lack of self-esteem	always poor reader
		1	reading as decoding	know big words
		2	speed, fluency	read fast, smoothly
		3	concentration, involvement	get into the book
		4	reading as comprehension	understand what is read
4.	self poor reader	0	lack of self-esteem	read choppy
		1	reading as decoding	don't know big words
		2	general high self-esteem	always good reader
		3	effort, concentration	don't try hard to read
		4.	reading as comprehension	don't understand what is read
5.	goal	0	focus on mechanics	pause at periods
		1	focus on decoding	get words right
		2	speed, fluency, concentration	read fluently, concentrate
		3	use of strategy	picture the story
		4	focus on comprehension	understand what is read
6.	better reader	0	irrelevant aspects	sound out more often
		1	focus on decoding	learn more new words
		2	focus on affect	like reading better
		3	focus on practice	practise more often
		4	focus on comprehension	check and make sure understand
7.	age	0	irrelevant	should read like adults
		1	general, global reasons	adults are smarter
		2	experiences	adults know more
		3	practice	adults read more
		4	conditional knowledge	depends on reading ability

8.	wealth	0	irrelevant	same school so same reading
		1	rich boy, general reason	John could get extra help
		2	rich boy, specific reason	John had more books to read
		3	poor boy, effort, compensation	Alan would try harder
		4	conditional knowledge	time, effort, etc.
9.	arithmetic	0	irrelevant	yes, might have more books
		1	general intelligence	yes, might be smarter
		2	specific dependence	yes, math requires reading
		3	exclusion	could be good at one not other
		4	different skills	math & reading not necessarily related
10.	good reader	0	age	older
		1	focus on decoding	know bid words
		2	focus on affect	enjoy reading
		3	focus on practice	read a lot
		4	focus on comprehension	understand what is read
11.	first	0	irrelevant	starts with a capital letter
		1	surface feature	begins with "once upon a time"
		2	first thing	tells what happens first
		3	general features	describes people, setting, etc.
		4	introduction, basic idea	tells what it is about
12.	last sentence	0	irrelevant	stop reading
		1	surface feature	ends with "they live happily forever"
		2	last thing	tells what happens last
		3	general features	tells how things turn out
		4	summary, conclusion	sums up, concludes the story
13.	length	0	irrelevant	Mark, story harder
		1	focus on length (general)	Mark, story longer
		2	focus on length (specific)	Mark, may have more lines
		3	focus on story type	depends on story type, level
		4	focus on reading ability	depends on better reading ability
14.	skim	0	no use of strategy	read every word, sentence
		1	easy sentences	easy ones, read faster
		2	hard sentences	hard ones, more information
		3	important sentences	ones that tell most about story
		4	coherent strategy	skim beginning, middle, final parts
15.	difficulty	0	mechanical aspects	print too small
		1	external situation	room noisy
		2	word level	big word, long words
		3	background knowledge	unfamiliar topic
		4	reading as comprehension	story doesn't make sense

16.	word	0	lack of trying	skip it-no indication of coming back
		1	implausible attempt	look at it again
		2	sound out, syllabify	sound out
		3	consult dictionary	look up in dictionary
		4	use of context	read words around, see how it fits (include skip and come back if use)
17.	sentence	0	lack of trying	skip it
		1	implausible attempt	sound out all words
		2	rereading	read it over and over
		3	external hints	look up hard words, look at illustrations
		4	use of context	read sentence before and after, see how it fits
18.	evaluation	0	irrelevant, mechanical	don't skip words
		1	word decoding	read words properly
		2	speed, fluency	read fast, smoothly
		3	affect, concentration	get into it, want to go on
		4	comprehension	everything makes sense
19.	image	0	no use of strategy	no, don't make up pictures
		1	use strategy, no explanation	yes, just comes to me
		2	as a support strategy	yes, so not distracted
		3	for fun, more interesting	yes, makes reading fun
		4	for comprehension	yes, helps comprehension, memory
20.	rereading	0	no use of strategy	no, never
		1	word level	yes, if forget some words
		2	as a general strategy	yes, it's good practice
		3	for memory	yes, if forget information
		4	for comprehension	yes, if don't understand

Appendix I

Description of Cognitive and Metacognitive Strategies Introduced During the Intervention

1. The '**RAP**' Strategy

R Read the paragraph
A Ask yourself what you just read (main idea and two details)
P Put it in your own words (main idea and two details)

Explanation of the strategy:

'RAP' is a strategy used to help students remember more of what they read, particularly for material with much detail or that which is abstract, for note taking, and for studying.

(SPELT; Mulcahy, Marfo, Peat & Andrews, 1987, p. 145).

2. The '**RIDER**' Strategy

R Read a sentence
I Imagine a picture of it
D Describe the picture to yourself
E Elaborate; clothing, colours, movement, setting
R Repeat previous steps, gradually changing original picture (e.g. like a movie).

Explanation of the strategy:

'RIDER' is especially effective in improving retention of descriptive writing such as novels, short-stories, etc.

(SPELT; Mulcahy, Marfo, Peat & Andrews, 1987, p. 160).

3. The '**COPS**' Strategy

C Are the first words in each sentence as well as the proper names capitalized?
O How is the overall appearance and readability? (i.e. spacing, legibility, indentation of paragraphs, neatness, complete sentences...)
P Is the punctuation correct?
S Are all the words spelled correctly?

Explanation of the strategy:
Students read a composition four times; each time for the purpose of checking the specific aspect of the piece represented by letters COPS. The strategy is designed for proofreading students' own writing after completion of a rough draft, for students' checking of each other's work before handing in an assignment, for checking group work after each draft, and for proof reading essay exam questions. (SPELT; Mulcahy, Marfo, Peat & Andrews, 1987, p. 78).

4. The '**STORY MAP**' strategy

Explanation of the strategy:

Students are provided with a framework for organizing, monitoring, and analyzing the relationships obtained from reading textual information. A story may can be built using the following procedure:

1. After reading a selection, the main ideas, major events, and major characters are listed.
2. The main ideas are placed in a circle in the centre of the map.
3. Lines are drawn projecting out of the central shape to handle the major events and characters listed in step 1, These lines should be arranged symmetrically around the central shape.
4. Key words for major concepts or events are written in outline shapes attached to the lines drawn from the circle containing the main ideas. Where appropriate, events should be ordered in a clockwise direction around the central shape containing the main idea.
5. Similarly, subevents and subconcepts can be entered around the shape containing the main ideas and events. The shapes used can vary in order to make the structure of the map easier to perceive.

(SPELT; Mulcahy, Marfo, Peat & Andrews, 1987, p. 182).

5. The '**IDEA DIAGRAM**' strategy

Explanation of the strategy:
A skeletal outline is provided to aid in organizing thoughts. This type of outline is used as a step between brainstorming and the writing of the first draft of a piece of work. The order of the paragraphs is determined after the organization of ideas on the diagram is completed.

(SPELT; Mulcahy, Marfo, Peat & Andrews, 1987, p. 134).

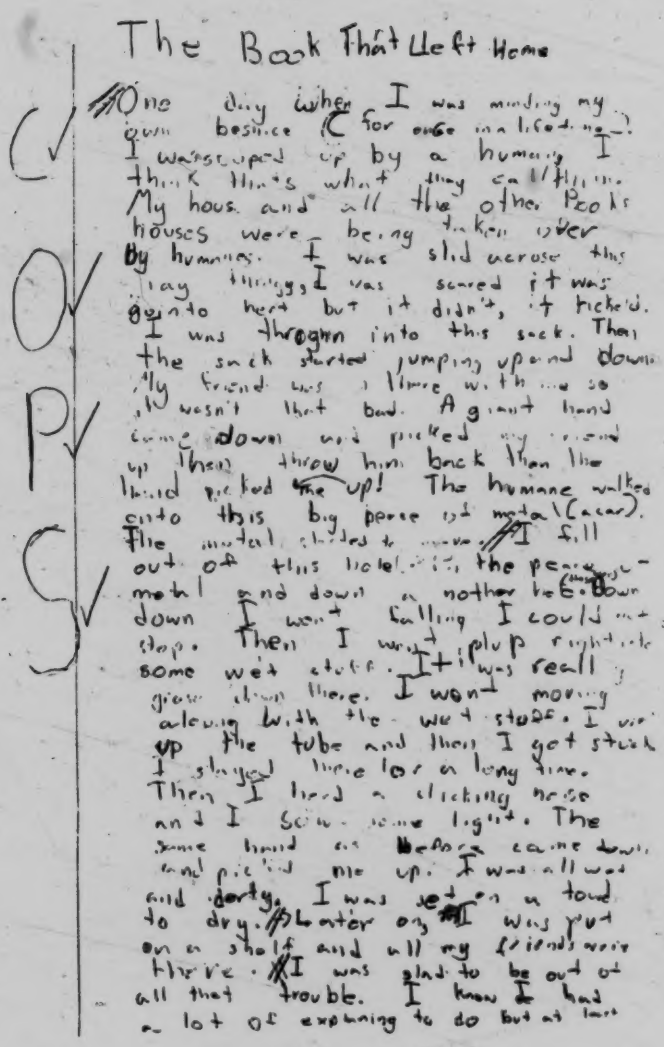
6. The '**STOP, YIELD, GO**' strategy

Stop Ask yourself "What do I need to do now/next?"
Yield Get organized, making sure you have all the materials you need for the next step. If you need to ask any questions of the teacher or peers, ask them now.
Go Get started immediately.

Explanation of the strategy:
This strategy was used to aid students in becoming more organized and self-regulating when working on individual or group research products, as well as when involved in creative writing. The three signs were posted in the S.T.A.R. classroom, and students either sat at their work areas and used the signs as visual prompts, or moved to actually stand by the signs as they asked themselves the questions needed to enable them to be highly on-task.

Appendix J

Actual work sample of John's application of the COPS strategy, including the "paper trail" indicating progress



The Book That Left Home

One day when I was minding my own bessice (C for once in a lifetime). I was scooped up by a human I think that's what they call themselves. My hous and all the other Books houses were being taken over By humans. I was slid across this tray thingy I was scared it was going to hert but it didn't, it tickled. I was thrown into this sack. Then the sack started jumping up and down My friend was there with me so it wasn't that bad. A giant hand came down and picked my friend up Then threw him back Then the hand picked me up! The humane walked into this big peice of metal (accar). The metal started to move. I fell out of this hole in the peice of metal and down a nother hole down I went falling I could not stop. Then I went plup right into some wet stuff. It was really grow down there. I went moving along with the wet stuff. I went up the tube and then I got stuck I stayed there for a long time. Then I heard a clicking noise and I saw some light. The same hand as before came down and picked me up. I was all wet and dirty. I was set on a towel to dry. Later on I was put on a shelf and all my friends were there. I was glad to be out of all that trouble. I know I had a lot of explaining to do but at last

The Book That left Home

One day when I was minding my own Bisstiice(for once in a life time), I was scuped up by a human. I thinkthats what they call them. My house and all the other book houses were being taken over by humans. I was slid across this ray thing. I was scared it was going to hirt,but it didn't, it tickeld. I was throughn into this sack. Then the sack started jumping up and down. My friend was in the bag too. A giant hand came down and picked up my friend then threw him back. Then he picked me up! The humans walked onto this huge peace of metalla car). The metal began to move.

I fill out of the hole in the peace of metal and down another hole(the sewer). Down,down I went, I could not stop! Then plop write into some wet stuff. It was really gross down there. I went moving alnang with the wet stuff. I went up this tube and got stuck.

I stayed there for a long time. Then I herd a clicking noise and sow a light. The same hand as before came down and picked me up. I was all wet and dirty. I was set on a towel to dry. Later on I was put on a shelf and all my friends were there.

I was glad to be out of all that trouble. I know I had a lot of explaning to do but at least I was home and out of that ugly bag

The Book That left Home

One day when I was minding my own business(for once in a life time), I was scooped up by a human. I think that's what they call them. My house and all the other book houses were being taken over by humans. I was slid across this ray thing. I was scared it was going to hurt but it didn't, it tickled. I was thrown into this sack. Then the sack started jumping up and down. My friend was in the bag too. A giant hand came down and picked up my friend then threw him back. Then he picked me up! The human walked onto this huge peice of metal(a car). The metal began to move.

I fill out of the hole in the peace of metal and down another hole(the sewer). Down, down I went, I could not stop! Then plopped wright into some wet stuff. It was really gross down there. I wen moving along with the wet stuff. I went up this tube and got stuck.

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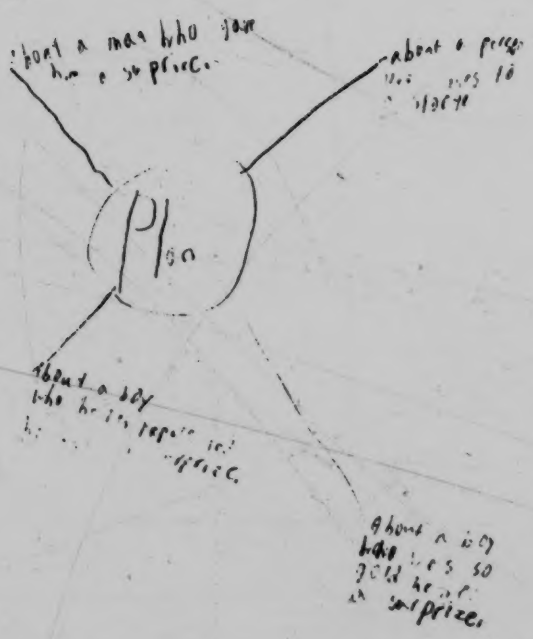
I was glad to be out of all that trouble. I know I had a lot of explaning to do but at least I was home and out of that ugly bag.

Appendix K

Actual sample of Paul's work demonstration documentation of a paper trail.



The boy who got a surprise

There was once a boy named Joe. His parents were very rich. They lived in Germany. One day to school something bad happened. One of his friends was being choked by the kids. Joe came and broke it the two kids. Joe said "Are you all right." His friend said, "Yes." So Joe started to make his friend laugh. Joe friend said, "Now I feel good." When Joe got back home at 5:30 he found [illegible] saw the house was wrecked. Joe heard some things. It was Joe's parents. Joe pushed one of the doors to the wall. [illegible] the police [illegible] robbers pushed him and [illegible] Joe for catching the thieves. Joe [illegible] the police came they thanked Joe for catching the thieves. Joe [illegible] the police [illegible] the house and [illegible] Joe [illegible] He got [illegible] open. It was made. It fixed everything the [illegible] before Joe's mom came home she said, "Joe, Joe where is mom." Joe's mom was [illegible] Joe mom said yes. Is the window open Joe [illegible] the house. Joe's parents [illegible] Joe's mom [illegible] Joe and Joe's mom [illegible] after.

The Boy Who Got A suprize

There was once a boy named Joe. His parents were very rich. They lived in Germany. One day at school something bad happened. One of his friends was being choked by two kids. Joe came and scared of the two kids. Joe said, "Are you all right. His friend said, "No." So Joe started to make his friend laugh. Joe friend said, "Now I feel good." When Joe got back home at 3:30. He opened the door.

He saw the house was wrecked. Joe heard something. It was two robbers. Joe heard something. It was two robbers. Joe pushed one of the robbers to the wall. He fell uncionus on the ground. The second robber grabbed him and pulled out a knife and said, "One more move and I will stab you!" Joe kicked the man's stomach and hit him in the head. Joe phoned the police. When the police came the thanked Joe for catching the robbers. One of the policeman said, "Here is something for you.

Joe went back in the house and went upstairs. It was hard to open it. So he used sciorrs. He got it open. It was a mircle. It fixed everything then was broken.

When Joe's mom came home she said, "Hi son." Joe said, "Hi mom." Joe's mom saw the vault open. Joe's mom said, "Why," Is the vault open, Joe said. "Two robbers broke into the house." Joe's mom said, "I understand." Joe and Joe's mom said, "I love you." Joe and Joe's mom lived happy ever after.

The Boy who Got A suprize

There was once a boy named Joe. His parents were very rich. They lived in Germany. One day at school something bad happened. One of his friends was being choked by two kids. Joe came and scared two of the kids. Joe said, "Are you all right. His friend said, "No." So Joe started to make his friend laugh. Joe's friend said, "Now I feel good." When Joe got back home at 3:30 he opened the door.

He saw the house was wrecked. Joe heard something. It was two robbers. Joe pushed one of the robbers to the wall. He fell unconious on the ground. The second robber grabbed him and pulled out a knife and said, "One more move and I will stab you!" Joe kicked the man's stomach and hit him in the head. Joe phoned the police. When the police came they Joe went back in the house and went upstairs. It was hard to open it. So he used scissors. He got it open. It was a miracle. It fixed everything then was broken. When Joe saw his mom around the coner of Brook Street, he was never so glad to see her come home. He knew he'd have some explainning to do but hopfully the surprize in the bag would help her understand.

When Joe's mom came home she said, "Hi son." Joe said, "Hi mom." Joe's mom saw the vault open. Joe's mom said, "Why." Is the vault open, Joe said. "Two robbers broke into the house." Joe's mom said, "I understand." Joe and Joe's mom said, "I love you." Joe and Joe's mom lived happy ever after.